Who Can Be a Pessimist?

THE fall trade prospects are most excellent. Another bounteous crop is assured, with prices to the producer higher than last year.

Every newspaper heralds in big headlines the gains as the days go by. "Corn selling at a new top, 85c per bushel." Last year's price at this time was 60c per bushel.

"Wheat scores another advance," and we read that September wheat in Chicago closes at $1.02¼ as against 99c a year ago, a gain of 3¼c, and that wheat in St. Louis was $1.03⅝ on Sept. 1st against 98¾c a year ago, a net gain of 4⅞c a bushel. And in Kansas City wheat closed Saturday, Sept. 1st, at $1.02⅝ against 93¼c a year ago, a gain of 9⅜c a bushel above a year ago.

That is for winter wheat, but when we look at the Minneapolis market we find spring wheat closed there Saturday, Sept. 1st, at $1.16¾ against a price of 99c on the corresponding date 1922, showing a price per bushel gain this year over last of 17¾c.

Now, this is all to the good and it makes the smiles begin to come to the faces of the farmers and merchants throughout the entire Mississippi, Missouri and Ohio River Valleys. It means more money to the farmers than last year. But corn is the grain which produced the real joy!

The closing prices on September corn for Saturday, Sept. 1st; the price a year ago; and the gain per bushel are given in the accompanying table:

September Corn	Sept. 1, 1923	Sept. 2, 1922	Gain
Chicago	84⅞	59¾	25⅛
St. Louis	85⅞	58⅝	27¼
Kansas City	79⅛	51⅜	28¾

The farmers of this land have raised this year over three billion bushels of corn; the market value today is 25c a bushel more than a year ago, an indicated gain of $750,000,000 in value over a year ago to the farmers. Is it any wonder they smile?

Verily the words of the old psalm of Judea can be lustily sung this year:

The valleys stand
  So thick with corn
That they laugh and sing:
  "Oh Lord how manifold
Are Thy works; in wisdom
  Hast Thou made them all,
The earth is full of Thy riches."

and then look at the prosperous Southland with 26c cotton assured their producers.

In every direction one may look, he sees the indubitable blessings of industry, intelligence and vision in this land this year.

The summer with its "lull" has passed. The fall with its call "to harvest" is here.

We are to garner the fruits of a bounteous prosperity for the whole nation.
Who can be a pessimist?

Better Felts
Better Jackets
Better Service

ONLY the best of wool is used in Appleton Felts and Jackets; only the finest of skilled workmanship ever finds place in their making; only the kind of service that makes friends and brings customers back is good enough for Appleton patrons.

A satisfied customer is the best advertisement. We can refer, with absolute confidence what their recommendation will be, to any of the large paper mills who have used Appleton Felts and Jackets for years and years, and have found them most dependable under the most exacting conditions.

If you have never used Appleton Felts and Jackets, we would appreciate an opportunity to quote you prices and tell you how and why they will deliver the highest degree of service, at the same time proving the most economical in the long run.

Full information on all standard or special requirements will be promptly and cheerfully furnished. Let us hear from you.

APPLETON WOOLEN MILLS
APPLETON, WIS.

Appleton
Felts and Jackets

EDITORIALS

Japan's Tragedy

IN THE midst of its prosperity as a foremost nation of the world, a disaster unparalleled in history has overtaken the people of Japan. The empire whose area covers about 260,000 square miles with a population of nearly eighty million is not unaccustomed to displays of seismic violence, for during the past three centuries, more than a hundred earthquakes have been sufficiently disastrous to merit historical mention, and if minor vibrations and shocks were to be included, the records of late years would show an average of about three tremors daily. But no catastrophe in ancient or modern history has been recorded which equals the loss of life and property that reports indicate has been destroyed in this latest and most horrible disaster.

Japan's greatest loss is probably in her silk industry and the United States is much affected in that we are the biggest consumer of their product. Of the 52,683,604 pounds of raw silk imported into this country in the twelve months ended June 30 last, 37,989,046 pounds or 70 percent valued at $298,798,272, came from Japan. In 1922 this country took 91 percent of the raw silk shipments from Japanese ports and most of the silk in storage at Yokohama at the time of the earthquake and fire is supposed to have been under contract for shipment to United States importers.

Paper has not figured so extensively in our trading with Japan. Of the five million dollars in total paper exported from this country in the first five months of this year, less than $325,000 covered the value of that shipped to Japan and imports were almost negligible.

Whatever the temporary effects of the disaster may be on American business, however, it is believed there is every evidence that eventually it will provide a broader range and a greater field for American products and producers than they have ever had before in the Orient.

Effective relief measures are now being carried out; supplies and welfare workers are being sent to the stricken centers. The Japanese people are not crushed, but widespread ruin and suffering are very real to those affected, and the relief we are giving as a nation will do more to promote international good will than all the treaties ever signed.

Coal Strike Ended

THE coal strike is ended, which began September first, and 158,000 anthracite miners will return to work on September 19th if the convention to be held in Scranton on September 17th approves the action of the scale committee. The contract which expires August 31, 1925, gives the miners a ten percent wage increase, the eight-hour day, collective bargaining and a revision of wage rates and schedules, which provides a thorough study of all wage scales before the expiration of the contract.

Though the anthracite using public cannot feel anything but grateful for the happy termination of an unfortunate situation, it must be remembered, nevertheless, that as usual it is the loser. The strike settlement means that anthracite will retail at from 75 cents to one dollar a ton higher than the rates that prevailed before the walkout.

However, we do not hesitate to express appreciation for the compromising efforts made by both sides in the controversy and their agreeing to prevent a national crisis. The untiring work of Governor Pinchot of Pennsylvania was responsible for the successful culmination of this controversy, and he is entitled, therefore, to strong commendation.

For President Coolidge, there can be nothing expressed but praise. He promised that there would be no embarrassment or shortage of fuel in the event of a strike and he was fully prepared to handle the situation through a federal fuel distributor for the distribution of substitute fuel. The settlement now averts this necessity, and the first big achievement of his administration has been recorded.

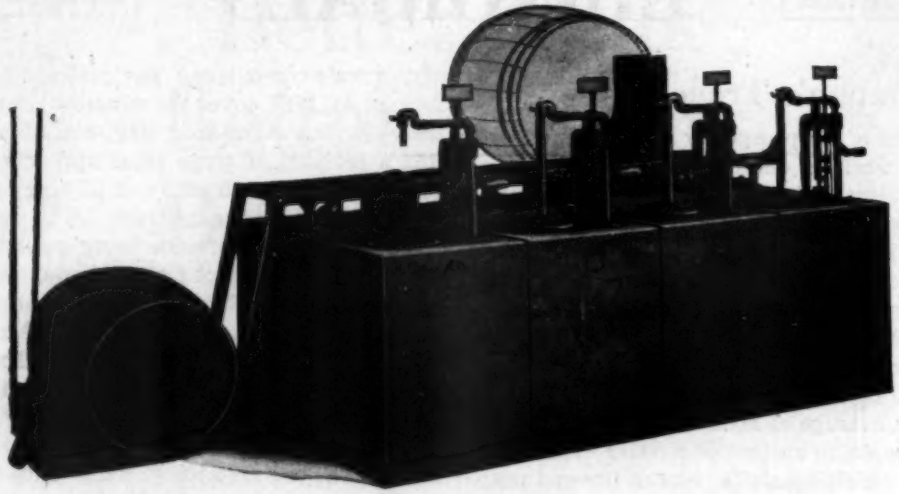
A Profitable Suggestion

A CANADIAN-AMERICAN council, composed of distinguished citizens of the two countries was recently unofficially proposed by Secretary of State Charles Hughes in the course of an address before the Canadian Bar Association.

This seems to be a helpful suggestion in that such a council, we believe, could remove or at least mitigate causes of irritation and misunderstanding which may arise between the peoples of the two commonwealths. Questions of broad policy or specific action which threaten the interests of either nation could be taken up and in most cases, if not all, amicably settled.

Peace and the cultivation of relations beneficial to both countries, we believe, are sincerely desired, and for that reason we hope that Mr. Hughes' suggestion will be seriously considered.

Beautiful plans and lofty dreams lose their value unless they are in some way built into action. The things people would do "if they had time" are not the things that are feeding the hungry or pushing the world along.



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How to Increase Earnings

One way is to increase the business—another way, one that every efficient plant is trying to accomplish, is to *decrease expenses.*

Mills, factories and machine operators are just beginning to realize the big saving that can be made in the *proper handling* of their oil supplies.

Over 10 per cent has been wasted through dripping, spilling, leakage, deterioration and failure to completely drain barrels. The time of help and machines has been lost because of inconvenience in handling the oil. The insurance rate has been higher and a very material saving has been lost by not buying in bulk.

American Lubricating Oil Storage Systems

prevent every one of these wastes and losses and gives you *better, cleaner* oil. The saving *pays for the equipment* in a short time.

A battery can be furnished of just the number of tanks you require. Each tank is fitted with a measuring pump having an anti-drip nozzle, giving exact quantities wanted without waste.

The material and construction of these outfits are of the highest order and fully guaranteed.

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Cut 90 Outfit Pump with Meter Attached

A clean, convenient manner for delivering oil into containers in exact quantities. Fitted with door and lock on both pump and cabinet. Capacity one barrel. A safe and sanitary method of handling oils in the different departments throughout the plant.

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The Pulpwood Situation in Canada

By PETER VISCHER

Mr. Vischer is a reporter for the New York World who has made a careful study of the Canadian Pulpwood situation and has learned the Canadian viewpoint on the Embargo authorized by the Canadian Parliament at its last session. After recently flying over the Canadian country he has learned a number of facts and seen some sad devastation with his own eyes.

The story is believed to be an accurate and fair presentation of both sides of the Canadian viewpoint, and that our readers might be fully and truthfully informed regarding their attitude, we are publishing the story.—EDITOR.

THE Canadian Parliament at its last session authorized an embargo on unmanufactured pulpwood because it was led to believe as the result of one man's ceaseless and convincing propaganda that the Dominion faces disaster unless the devastation of its forests is checked.

The embargo may be imposed at the discretion of the Government, but whether this will ever be done is a question. At the present time the embargo seems doubtful except to its most ardent sponsors, for it is a radical measure and powerful interests are bringing all their pressure to bear against it.

At any rate, nothing will be done about the embargo until a Crown Commission appointed to investigate the entire pulpwood situation completes its findings and makes its report. This will take weeks, many weeks, and probably months, for the commission has only just been appointed.

Joseph Picard, a manufacturer of Quebec City, has been named chairman of the commission. Its other members are Appollos Bamber Kerr, a lawyer of Toronto; Robert W. McLellan, a lawyer of Fredericton; Joseph G. Sutherland, a lumberman of Clyde River, N. S.; and William Anstie, a contractor of Vancouver. Ernest Herbert Finlayson, acting director of forestry in the Canadian Department of the Interior, is attached to the commission as its secretary.

The order-in-council making known the appointments, published August 15, outlines the scope of the inquiry, its purpose, and the remuneration to be received by the commissioners. The commissioners are instructed to inquire into the report upon the forest resources of Canada with regard to the extent in each province of wood of various kinds available for pulp, the quantity of wood so available on lands owned by the provinces and subject therefore to restrictions requiring the partial or total manufacture of such wood in Canada, the quantity of wood so available owned by the Dominion Government subject to similar restrictions, the quantity of wood so available on other lands and the conditions under which such lands are held and by whom, the quantity of pulpwood produced in each province during the past ten years with the percentage used in Canada and the percentage exported, any other essential information, and finally recommendations concerning the prohibition or restriction of the export of pulpwood from Canada. The chairman is to receive $35 and the commissioners $25 each, plus expenses, for every day devoted to the inquiry.

Canada means to be fair about the embargo; there is no reasonable doubt about that. If any evidence is needed it ought to be supplied by the fact, not generally known, that the man who brought about the authorization of the embargo by his fifteen months' publicity campaign, was offered the opportunity to investigate the situation himself, as a committee of one. He declined, frankly admitting he was biased, but expressing his confidence that any committee of intelligent Canadians which would study the problem would find for an embargo just as he had done.

The man is Frank J. D. Barnjum, a retired lumberman, now 64 years of age, who made millions by farsighted and courageous lumbering operations in the United States and Canada. Some years ago he disposed of his American holdings and three years ago he gave up his business altogether to devote all his time—and considerable of his money—to his hobby: "Canada's forests for Canadian industries."

By typically American publicity methods, by pamphlets and flyers, by prize competitions, by letters, by speeches, by agitation in the daily press, Barnjum in an astonishing whirlwind campaign made the Canadian people realize the magnitude of its forestry problem.

Canadians feel that some steps must be taken to solve this problem, growing with every minute. So colossal have been the losses by fire, insects and wind during recent years that the loss by lumbering operations have been dwarfed. The combined forces of devastation, unchecked, have it in their power to lay Canada waste in as short a time as a single decade.

Embargo Only Part of Program

As a matter of fact, the embargo is looked upon by Canadians as only one feature, important but not all-important, of a great forest preservation program. They have grasped at it now because they were assured that for an emergency the embargo is

the most certain and the most economical means of halting destruction and at the same time keeping up business.

The full program, briefly stated, calls for the following:

1.—Prohibit the exportation of unmanufactured pulpwood.

2.—Reduce the timber cut on Crown lands by one-half, in this wise guaranteeing a market in Canada for the woodpulp whose exportation would be prohibited by the embargo. Canada exports half as much as it uses.

3—Withdraw all forested lands from settlement.

4—Prohibit hunting and camping in the woods during dry periods.

5—Enact uniform laws in all the provinces providing for the safe disposal of slash during the winter months.

6—Greatly increase all appropriations for forestry and entomological departments, schools of forestry, and the Canadian Forestry Association. The insect peril may become as great as the forest fire menace.

7—Develop a semi-military force of forest rangers, somewhat along the lines of the Northwest Mounted Police.

8—Electrify all railroad lines through forested areas.

It will be seen, then, that it would not be fair to say that the embargo is aimed at American capital and American industry, which it so seriously embarrasses. The embargo means more to Canada than just a thrust at a competitor. And anyone broad-minded enough to see both sides of a great question will admit that there is considerable of justice in the Canadian viewpoint on the embargo.

Indeed, Canadians claim that the embargo will not seriously affect American industry at all; they insist that Canada, even now when it is shipping more than 1,300,000 cords of unmanufactured pulpwood into the United States, is only supplying 20 per cent of the States' needs for the year. Furthermore, only 2 per cent of Canada's farmers and a much smaller percentage of Canada's total population would be restricted by the embargo.

Canada is today one of the greatest pulp and paper countries in the world. Canadians believe it is destined to be the greatest of all, because it has vast tracts of lumber with economically harnessed water power side by side. Paper manufacturers know that the circumstance is ideal, inasmuch as it takes practically 100 HP. to produce a ton of paper.

Development of Canadian Paper Industry

The great development of Canada's paper and pulp industry has all come during the past few years, although Canada has been making paper for more than a century, the first mill having been established at St. Andrews, Quebec, in 1803. Its development can be traced to a number of causes.

First and foremost is the fact that the five woodland provinces—Quebec, Ontario, British Columbia, New Brunswick and Nova Scotia—have had since 1900, laws requiring that wood cut from Crown lands must be submitted to at least one process of manufacture in the province in which it is cut. Inasmuch as 85 per cent of Canada's woodland areas are Crown lands, the effect of this legislation has been considerable in building of Canada's industry.

Other reasons for the development of the industry are the growth in population and the spread of education, which have greatly increased the per capita consumption of paper in every civilized country; the great increase in the number of newspapers and periodicals, particularly on the North American continent; the proximity of the United States with its rapidly growing population and its gradually diminishing supply of paper making materials, compelling a consequent increasing reliance upon other countries for its paper supplies; and lastly, the vast improvement in paper-making processes, of which Canadian manufacturers have been among the first to take full advantage.

Canada today has 100 mills—40 pulp, 33 paper, and 27 pulp and paper. These mills, distributed from one coast to another, represent a capital investment of $400,000,000. To the distress of Canadian officials, I learned that more than $200,000,000 of this capital is American. One official high in Canadian paper circles checked off twenty of the greatest mills as being quite American.

In fact, Canadians charge that Americans dominate the Canadian industry and, naturally enough, they resent this foreign invasion. The American mills are publicly neutral on the embargo question, though many of them with branch mills in the States are privately bitterly opposed to the embargo. The power of the American mills is so great that the Canadian Pulp and Paper Association, which comprises practically all the paper mills in Canada, has declined to take a stand for or against the embargo. The Association is content with the statement that it "favors any means that may promise a prolongation of Canada's pulpwood and timber supply."

One of the alternate means suggested is an export duty on pulpwood with the revenue obtained devoted to the protection and renewal of Canadian forests. It is evident, therefore, that the embargo lacks the backing of its own people for a very evident reason. That makes its imposition all the more unlikely.

Incidentally the domination of the Canadian industry by Americans has brought forth a serious charge, one that has not yet been made publicly, but is sure to be made should American protests against the embargo become too loud.

Secretary Beck Makes Charge

"I charge," said Edward Beck, secretary and manager of the Canadian Pulp and Paper Association,

"that certain American mills—and I can name them —are holding their American timberlands safely uncut and protected, while they are ruthlessly and carelessly devastating Canadian timberlands without any thought for the future."

In 1908, when records were first kept, Canada consumed 482,777 cords of pulpwood. This figure jumped to 2,777,422 cords by 1920, nearly six times as much. Exports in the same time rose from 859,409 cords to 1,011,832. Today cutting is going on at the rate of 5,000,000 cords, of which 30 per cent is being exported in a raw state.

All of the unmanufactured exports, as has been explained, come from the 15 per cent of Canada's woodland tracts which are not Crown lands, inasmuch as the cut from the Crown lands must be manufactured on the northern side of the border. And this 15 per cent is in the hands of farmers.

Proponents of the embargo argue that the farmers who hold these forest lands are interested not in the future of Canada's forests but in the immediate return offered by Americans who want their pulpwood in a raw state. Statistics have it, furthermore, that only 2 per cent of all Canada's farmers hold this 15 per cent. The other 98 per cent neither have forest lands nor care a rap about them.

A comparatively few farmers, then, are shipping vast quantities of raw pulpwood out of Canada to conserve American forests and keep going American mills, which are in competition with Canada's own mills. The Canadian's viewpoint, rather indignant, as a result of this is not so difficult to understand.

But this is really a minor reason for the embargo. The big reason lies in the astounding destruction of Canada's "inexhaustible" forests during the past few years by fires, insects, windstorms.

Fire Is Greatest Destroyer

Insects annually destroy as much timber as is cut by lumbermen. Barnjum has statistics to prove that windstorms annually destroy as much timber as is cut. And these two together destroy but a fraction of the timber, actual and potential, that is annually ruined by forest fires. Fires form the greatest menace Canada's forests know.

Public officials admit openly that fires destroy more than the amount of annual cutting. "More," that's what they admit. The Paper and Pulp Association will estimate that the loss by fires is "several times" as great as the annual cutting. One official high in paper circles told me, on my promise not to quote him by name, that the loss by fires last year reached the astounding total of twenty-six times as much as the annual loss by cutting. Twenty-six times as much!

"When the appalling fire losses which the enemies of Canada are now trying to minimize are tabulated this fall," predicts Barnjum, "they will prove so perfectly colossal that they will create a panic."

These figures are, of course, hard to check up. Foret rangers will tell you that the loss by fires cannot be accurately computed because the fires do not come in virgin timber as a rule but in young growth, which has a relatively small immediate value but a much greater potential value. Certainly it is true that if Canadians only had their annual cut to contend with, and there were no loss from these other causes of devastation, then there would be today just as much timber in Canada as there ever was.

Already there have been more fires in Canada this year than during all of last year. And last year it happened that the worst month of all for forest fires was the month of September. If that experience is repeated this year Canada will be in a bad way.

It has been a horrible year for fires, despite the fact that stern methods were taken to detect fires and fight them promptly. Each of the provinces has an elaborate machinery for fighting fires with patrols and lookout towers, telephone lines, caches of pumps and equipment, and a personnel of foresters and rangers that runs well above a thousand each.

Ontario and Quebec have even had airplane patrols all during the year, utilizing the entire service of the Laurentide Air Service, the largest commercial flying organization in Canada, with a fleet of nine seaplanes and a corps of crack flyers from the Canadian Air Force.

An exhibition of fire control was given the British Empire Forestry Conference, now touring Canada, when it met at the Temagami Reserve during the middle of August. A plane equipped with radio went up with the pilot, mechanic, observer and a radio operator. A fire was spotted many miles away. It was pin-pointed in the air. In a very few seconds the location of the fire and a brief description of it were radioed to the airplane base. And in less time than it takes to tell, a corps of rangers had pushed off in a motorboat with a pump, hose and other fire-fighting equipment.

Yet despite all these measures fires cannot be checked. This is unhappily true, even though it has been established that 96 per cent of all fires are started by human hands, and a campaign of education has been pushed without rest in an effort to educate a careless public.

"We boast sometimes of our greatly improved fire protective measures and increased fire-fighting equipment, but at the same time our losses are increasing from year to year, and if very radical measures are not adopted they will continue to increase. I do not see anything that can prevent a national catastrophe unless the most drastic measures that can be conceived by man are adopted."

That is Barnjum's opinion, and it carries considerable weight, inasmuch as he has proved by experience that he knows how to handle lumber economically. That he is listened to, incidentally, is proved by the endorsements given his work by such

men as the Hon. W. S. Fielding and the Hon. Arthur Meighan.

The foresters, curiously enough, who might be expected to be strongest for the embargo, are not interested in it. They wonder what is behind all of Barnjum's campaign. And frankly they think the embargo is something hanging in mid-air.

"Forget all this talk about an embargo," one of the shrewdest foresters in Ontario told me. "The big question we have to handle is that of slash disposal—waste disposal. If we don't do something drastic about our slash disposal in very short order we won't have any pulp left on which to place an embargo. Slash breeds fires and fosters them. And fires are our big problem—fires, not politics and flapdoodle."

Still, this same forester, who could see no problem as great as the one creating all his troubles, admitted that Barnjum had done the cause of forestry a tremendous amount of good. People who never thought there was a tree in all Canada, he said, now realize how great Canada's forestry problem is.

There is little or no reforestation. Lease-holders of Crown lands will not reforest because their leases are of very short duration, usually only a year. There would be no sense, from their viewpoint, to reforest for someone else. Capital cannot be interested in the reforestation of Crown lands, because the cost of clearing the land, reseeding and tending the young growth would make the cost at maturity prohibitive. The provinces cannot afford to reforest from their own treasuries.

Private lands are without attempts to reforest, because their owners are not worried about the future. Much to Barnjum's disgust, with but few exceptions they are interested only in the immediate return they can get from their lands.

Arguments Against Embargo

Two important arguments, and one that is considered trifling, are advanced against the embargo. Proponents of the embargo believe that they can satisfactorily answer these arguments, and to the betterment of Canada's well-being.

The first argument is that the United States may retaliate. This fear is groundless today, in Barnjum's opinion, whatever may have been the case in the past, "for the reason that the United States forestry authorities already recognize and admit not only the justification of such a policy as a means of preserving Canada's economic integrity, but have themselves shown the way by adopting a similar policy whenever it was to the advantage of the United States to do so." Barnjum quotes Col. William B. Greeley, Chief Forester of the United States, to support him.

Furthermore, says Barnjum, fear of retaliation is unworthy of a great unit of the British Empire. The proud answer to such a fear, he says, ought to be found in the building up of a finer inter-Empire trade.

And finally, Barnjum claims, talk of retaliation is pure bunkum. "When have the politicians of the United States waited for a cause for retaliation," he asks, "when it was to their interest to put the screws on Canada and to bar out practically everything which we could export to that country, except such things as they are obliged to have, including raw materials and pulp and paper?"

Most Canadians, incidentally, are bitter against the Fordney-McCumber tariff. Mr. Beck of the Pulp and Paper Association, for instance, cannot see why the United States, if it wants free access to Canadian pulpwood continued, should not open its markets to Canadian book and fine papers, Kraft and other papers, which now pay a duty of 25 per cent.

The second argument against the embargo is that it would deprive Canadian settlers of a profitable market for their wood. This is met with the retort that, owing to the tremendous shrinkage in the Canadian wood supply, there is now a market in Canada for every cord of wood a farmer can offer.

As soon as an embargo is imposed, it is claimed, the Canadian consumption of pulpwood will be increased to a very large extent, because of the fact that many of the mills now on the American side of the border, which are entirely dependent upon Canada for pulpwood, will have to move to Canada. Furthermore, the demand for paper from Canadian mills will be increased. And not unimportant by any means is the fact that the Canadian farmers selling their wood for manufacture in Canada, instead of for export, would be helping to build up home industries and helping to create a home market for their own produce.

It is argued, for instance, that when a carload of unmanufactured pulpwood is shipped out of the country there is no return freight. But for every carload of paper shipped, four carloads of other materials and supplies have to be hauled to the mills, thus producing an enormous additional revenue for Canadian railways and other businesses.

The third argument, least important, is the one so familiar to American ears. The embargo, it is claimed, amounts to an infringement of the farmers' personal liberty. Proponents of the embargo argue that when an emergency demands action for the good of a vast majority, then the liberties of a trifling minority must be ignored. Furthermore, it is pointed out that every European country restricts the forestry program of its citizens.

Barnjum Pleads for Embargo

The embargo, then, is looked upon as a vitally important emergency measure. Reforestation will not do, although it is very important. But only an embargo, it is claimed, can now save Canada's industries during that period when the end of the present supply is at hand and the new crop is ready to be harvested.

"The embargo is the only way by which Canada

can obtain a large measure of immediate conservation," is the way Barnjum puts it. "Its most attractive feature is that it will not cost the Dominion one dollar. This is not a question of what Canada would like to do; it is an act born of the sternest necessity. Without an embargo now, the pulp and paper and lumber industries, which now play so important a part in our national economy, must, sooner or later, dwindle and disappear—and with them the capital they represent and the revenue which they contribute to Canada's well-being.

"Not only have we not a sufficient supply of wood for the mills at present operating, but we are suffering positive and serious ills because we have already denuded our wooded areas to too great an extent. The truth of this is attested by every means at nature's command—by extremes of temperature, by floods and droughts, by tornadoes, by insect plagues.

"Our industries dependent on water power are already forced to reduce their operations, in a great many cases, to half time or less. The increasing losses from forest fires and even the recent appalling epidemic of typhoid in northern Quebec can be traced to the same source—low water conditions originating from the too lavish destruction of our forests. The recent heavy losses sustained by the spruce bud worm was largely due to the drying up of the earth's surface.

"In other words, nature's whole equilibrium has been upset by the hand of man, and we Canadians are now paying the inexorable price. Nothing short of drastic reforms will save Canada from a disaster only second to that which overtook China out of precisely similar conditions."

Service and Selling

By T. J. BURKE, C. A.

Secretary-Treasurer, Salesmen's Assn. of the PAPER INDUSTRY

THAT any industry which considers the adoption of a method of selling its products through an **Open Exchange** thereby issues a distinct challenge to the salesmen in that industry, cannot be disputed.

During the past decade rapid strides have been made in the art of salesmanship, and although there are some who think that the pulp and paper industry has lagged behind in its sales methods, yet I believe we are all willing to admit that some progress has been made in the right direction. There have been notable instances of mills that have specialized in certain products, and by means of national advertising and modern sales methods have succeeded in making their product known from Maine to California. They are, however, few and far between. When one thinks about this, one is naturally somewhat surprised, considering that the product which this industry sells is the one so much affected by the amount of advertising placed by industry at large. Manufacturers of certain grades of paper cannot help but be informed of the amount of advertising being done throughout the country, since this must have considerable effect upon their sales. Inasmuch as this is a fact, is it not strange that more of them do not come to an appreciation of the benefits to be derived from a constant and consistent advertising policy? Doubtless there are good reasons why more national advertising is not done by pulp and paper manufacturers, of which I am not aware. However, as the new Secretary-Treasurer of the Salesmen's Association, I must take an increasing interest in selling and distribution methods in the industry.

It has been said on numerous occasions that the distribution methods in use generally in the industry cost more than they ought. The reasons for this are not far to seek, but the means for changing these methods are difficult to suggest. That is a matter, however, which I would like to see taken up seriously by the different groups within the industry.

To return to the **Exchange Method** of selling, while this method has been in use for some years, in the selling of stocks and bonds and certain raw materials it has not, as far as I am aware, ever been successfully used in the case of any fabricated products. It is said this method of selling makes a great appeal to the average man. Why? Because it is quick and easy and apparently inexpensive, since one or two brokers might, according to the claims made, be able to sell as much paper or paper products as a fair number of salesmen. As stated above, since most of us admit that the selling and distributing methods in use might be improved, it can be very easily understood, therefore, why at first sight this system of selling appeals to the average man.

It should be remembered, however, that those **Exchanges** which have been carrying on successfully for years are dealing in raw or basic materials the quality of which can easily be ascertained. Take the Stock Exchanges; no stocks and bonds can be listed on these **Exchanges** until statements have been submitted and verified regarding the affairs of the corporations issuing them, so information regarding their intrinsic value is easily ascertainable. In other words, they are **graded** by experts. Again, in the case of the grain and cotton Exchanges, experts are employed to grade all materials offered for sale on these Exchanges. Of course disputes occur between these experts and sellers, but the decision of the former is final and must be accepted. This expert

work can only be done by those who have had a great deal of experience, and requires constant care to avoid mistakes. Now, in the latter case these experts are dealing with raw products which only vary because of natural conditions.

Selling the Fabricated Product

Now let us consider the case of an **Exchange** dealing with a **fabricated product**; that is to say, with something made from various raw materials, by the use of various machines under varying conditions. How is it possible for anybody, no matter how expert, to certify to the fact that a certain fabricated product is of the grade represented by the seller? No doubt a great deal could be done to make it possible for experts to thus certify by standardizations in the different groups in the industry, but it seems to me, at any rate, that such standardization must take place before it will ever be possible for any large amount of selling to be carried on by means of an **Open Exchange.**

It has been suggested by one group in the industry that one of their products should be taken as the base, and that the other products should be valued by means of a **fixed differential** from the value put on the basic product. Is this legal? We are told that it is; but according to information which has come to hand, it would appear that at least there is reasonable doubt on this point. Even if this is granted, however, there still remain important problems to be solved in the working out of this **Open Exchange** method of selling. For instance, in all probability, judging from the difficulty experienced in classing certain kinds of imports, there will be disputes regarding the grade in which certain paper products are to be included. But there is another and far more important problem which we might consider in this connection. An **Exchange** necessarily must settle its own disputes, otherwise confusion would reign supreme. It therefore is necessary to arrange for arbitration of such disputes, and that the Exchange members should agree to accept the decisions of the arbitrators appointed as final.

When dealing with **fabricated products,** it is obvious that the duties of such arbitrators may involve considerable work and necessitate investigations which would prove very irksome to manufacturers.

Among the articles of an **Exchange** which has recently been opened in Chicago, I am told the following Sections appear:

Accusations by Members—One or more members may file with the Board at any time a written accusation charging a member with one or more offenses against the Exchange. The accusation shall state in detail the acts or omissions complained of and shall be signed by the member or members making the accusation.

Investigating Committee—If at any time the Board shall have reason to suspect that any member has been guilty of an offense against the Exchange, and no accusation charging such an offense has been filed, the Board may appoint a Committee to investigate whether there is just ground for such assumption. If the Committee decides that there is, it shall file with the Board a written accusation against the suspected member, charging him with a specific offense and stating in detail the acts or omissions complained of.

Committee May Compel Appearance, Etc.—The Investigating Committee may require the member under investigation to appear before the Committee and testify concerning the subject matter of the investigation. The Committee may also require such a member to produce such of his books and papers as the Committee may deem relevant to the investigation. Such member shall be under obligation to appear and testify, or produce his books and papers, upon written notice served not less than ten days before the hearing before such Committee. Notice signed by the Chairman of the Committee requesting the member under investigation to appear and testify, or to produce books and papers served personally upon such member, or sent by registered mail to his place of business, shall be sufficient notice under this section.

Board May Compel Appearance of Accused—The Board, if it sees fit, may by notice compel the accused to appear and testify, and to produce such of his books and papers as the Board may direct. Such member being so notified to appear and testify, or to produce books and papers, shall be under obligation to appear and answer all questions and to produce all books and papers which the Board may deem relevant and proper. Written notice, signed by the Secretary and the Exchange, requiring the accused to appear and testify, or to produce books and papers served personally upon the accused or sent by registered mail to his usual place of business, at least ten days before such trial, shall be sufficient notice under this section.

Settling Disputes

Let us consider just what this means. If it means what the words apparently imply, it would seem that any member can make an accusation against another, which might necessitate his divulging confidential information in order to clear himself. As will be seen, one section explicitly states that, even if there is only suspicion without any accusation, an investigation may be made, and, moreover, that during this investigation the one against whom suspicion is directed may be called upon to produce any books and papers required by the Board or Investigating Committee appointed by the Board.

Personally, I fail to understand how disputes could be settled without any such provisions, when trading is conducted on an **Open Exchange.** That provisions must be made for the final settlement of all disputes

cannot be denied, and the possibility of disputes arising when dealing with **fabricated products** is, of course, much greater than when dealing with raw materials, which can be graded accurately without too much difficulty. But granting the necessity for thus making arrangements for the settlement of such disputes, one is obliged to consider very carefully the results of such investigation. In other words, manufacturers joining such an Exchange must necessarily be willing to place themselves in a position where they will be obliged, should any other member make an accusation against them, or even suspicion is entertained against them, to divulge information regarding their business which may be of vital importance to them. Should they refuse to give such information, they would be liable to expulsion from the Exchange, which could not but have a deterrent effect on their standing in the industry, having once joined the Exchange.

This is undoubtedly one of the bad features of such a method of selling. There remains another important point, which should be carefully considered by anyone contemplating disposing of their products through this medium, also by those considering making their purchases in this manner, and that is the question of **Service.** It is unquestionably becoming more and more recognized that this industry must carry on an educational propaganda for the purpose of instructing the public generally as to **Papers and Purposes.** For what purpose is the paper to be used? That is the question that a good salesman asks first of anybody whom he suspects is not well grounded in paper lore, and then proceeds to do his utmost to sell that prospect the right quality of paper for the purpose stated.

An Exchange is inanimate. You go in and make your purchase, and there the matter ends. It is final, except that if you are not satisfied you may make a complaint, which will be investigated. Judging from the results of investigations made by those Exchanges at present operating, it is very doubtful whether, without a great deal of trouble, you will be able to get satisfaction unless your complaint is very fully justified.

While the Exchange may contemplate giving service to the industry in a general manner, it would necessarily be impossible for it to even attempt to give the service which an individual salesman can give to an individual buyer. That this individual service is appreciated by buyers is, of course, a fact, and will in all probability constitute one of the chief reasons why the **Open Exchange** method of selling will never become very popular. **Papers for all purposes** is a slogan which describes clearly the fact that paper is a product which is put to a great many uses, and consequently must vary according to the purpose for which it is to be used.

That a clever buyer with a thorough knowledge of all kinds of paper, in other words an expert, might possibly buy to slightly better advantage through an Exchange, may be true or may not, because it is possible that with such a knowledge of paper he would probably know where to go to buy the paper he required to the best advantage. Those without such a knowledge would have to take a chance when making purchases in this manner, no matter how careful they might be.

Finally, at a time when great efforts are being made to place the industry on a sound economic basis by educating paper users to the fact, that the cheapest paper is not always the cheapest in the end, it seems that the opening of an **Open Exchange** will not be beneficial.

Paper should be sold on quality and not price. The **Open Exchange** method of selling undoubtedly will emphasize the latter, and to my mind will do very little to educate paper buyers to the necessity for carefully investigating the purposes for which the paper is to be used, and then ascertaining the correct grade of paper to buy. It seems, therefore, that the **Open Exchange** method can never supplant the **Individual Service Method,** at any rate in the pulp and paper industry.

Importance of Statistical Study

THE days of becoming a millionaire in twenty-four hours never have existed and never will, at least in the lives of those who cannot see beyond the tip of their nose," says the Business Consultation Bureau of LaSalle Extension University in a recent report, discussing the importance of statistics in analyzing business situations.

"The study and understanding of statistics, one of the chief means of helping a man to look ahead and make his plan for future progress on the basis of what has happened in the past, comes only through long practice and careful observation. To explain how the different laws work out and to give the meaning of the ups and downs of a certain security is the same as trying to explain the action of the heart without knowing something about its relation to the other parts of the human body.

"For many persons, figures are just abstract things while to those who can read and interpret them, they are almost human beings, telling you day by day the history of an organization or a nation's progress. Take, for instance, the price of an ordinary U. S. bond. Just why is it that at times, during a term of years, the price of this bond has been $75, at other times $90, and still at others, $100? What is causing this fluctuation? Is it the security behind the bond, or the income it brings in a year? How about economic conditions in the country? Has the rate of other bonds anything to do with its value?

"Take the question of wages. Why is it that three years ago people in the United States seemed more prosperous than ever before in their entire his-

tory? Compare the situation with the experience we had a year ago. What conditions created all that unemployment and how about wages, the purchasing value of such wages? Has income anything to do with the commodity prices? When wages go up, are commodity prices going up or coming down? When labor becomes scarce, what happens to wages? Have statistics on immigration anything to do with labor and wages? How about the output of manufactured products? Have manufacturing statistics anything to do with immigration or labor statistics? What can we expect from such historical facts as revealed by means of statistics? What can we say of bank deposits? Has a constant, upward trend of loans and discounts any significance? How about the clearings? What of the specie ratio behind deposits? Of the specie in the country? What of exports and imports and our balance of trade? Have they any bearing on the rate of interest the banks are going to charge/

"Statistics of any kind must be interpreted in the list of a good many economic factors, the workings of which must be understood to permit the best planning."

Coloring Paper

BY ISMAR GINSBERG, B. Sc., Chem. Eng.

THE manufacture of colored papers is an important branch of the paper making industry of this country. There are many uses to which colored papers are put, outside of the regular printing and lithographing fields. For example, considerable colored paper is employed in the making of novelties and paper decorations, lining of boxes and containers of all sorts, and for many other similar purposes. The many different kinds of colored paper, the many colors in which it comes on the market, the various finishes that are given to it, the application of the color throughout the mass and on the surface only make the manufacture of colored paper a rather intricate process, in comparison with the other paper manufacturing methods.

General Principles

In order to understand the operation of the different processes that have been invented for coloring paper, it is well to consider first the general principles of colored paper manufacture. There are two general ways in which the color can be applied to the paper. The pigment or dyestuff can either be mixed directly with the paper stock in the beater, or else the color can be applied to the surface of the paper web at different points in its manufacture and in different conditions of wetness. The two methods are entirely different and it makes a considerable difference both in the way in which the color is applied and in the selection of the colors used, as to what method is employed.

Some paper makers are prone to think that the coloring of paper in the beater, coloring in mass, as it is known, is a simple operation and requires no particular attention. Their belief is that all that is necessary is to weigh out a certain proportion of color, enough to give the desired shade, and add it to the beater "let 'er rip." They are sometimes surprised under these circumstances to find that a poor quality of paper is produced, that the color is not properly distributed or forms blotches and spots on the paper and other similar imperfections result. There are actually many different factors that must be taken into consideration in order to avoid defective products.

In the first place there is the question of the stock from which the paper is made. What effect has the paper stock on the color? It need scarcely be mentioned that it is not advisable to try to dye a paper which is made entirely from mechanical wood pulp. For no matter how fast the dye may be, it will soon turn brown on exposure to light. For similar reasons unbleached sulphite pulp cannot be used, while unbleached soda pulp acts a little better. Any kind of bleached chemical pulp can be used with good results. The best stock is bleached half-stuff made from cotton and linen rags.

Pigments and Dyestuffs

The next thing to consider is the coloring matter used. These are generally of two kinds, the pigments and the dyestuffs. The pigments, such as the ochres, umbers, ultramarines and Prussian blues are for the most part insoluble substances and are added to the beater. The dyestuffs are used in solution and these are principally the acid, basic, substantive dyes with some sulphur and vat colors. Substantive dyes give fast colors. Among these may be mentioned cotton yellow, thiazin red, cotton red, paper yellow, the lithol, authol and helio fast dyes. Pigment dyes are used largely because of their great covering power, which is developed to a maximum degree when the color lake is allowed to remain in contact with the paper stock in the beater for as long a time as possible. Many acid and basic dyes are used as well, for fastness to light is not so essential in dyeing paper, but it should be remembered that the nature of the fibre of the paper as well as the use to which the finished product is going to be put must be taken into consideration in the selection of the color.

Many dyes must be fixed on the fiber by means of mordants. For example, tannin mordants are employed to fasten basic dyestuffs to the paper fiber,

but where the latter is constituted of wood pulp, these need not be employed as the lignin in the mechanical wood and also in unbleached chemical pulp serves as a mordant itself. This is the reason why basic dyes are used so largely for this purpose. The substantive dyes can be used for dyeing paper directly without the need of mordants. They are generally used on the higher grades of paper made from bleached raw materials. The class of colors known as the direct cotton dyes are particularly well suited for dyeing blotting paper, where no size can be used. The special feature of these colors is that they can be used in direct dyeing and that they fasten themselves quite firmly to the paper fiber. Their fastness varies, some being very fugitive, while others are classed amongst the fastest colors known.

These colors are used in the beater and in order to obtain a clear backwater it is good practice to add about 75 pounds of salt to a 1,000 pound beater. The salt serves to throw the color out of its water solution. There is a tendency for these colors to bleed out of the fibers, especially white fibers. This makes them unsuitable for use on granite papers, but it is possible to prevent this action to some extent by topping with basic colors. It is also claimed that good results can be obtained by the addition of 10 pounds of Glauber's salt per 100 pounds of the paper stock and boiling for three quarters of an hour. Fastness to water is attained in this manner.

Acid colors are also used for dyeing paper, but they cannot be employed with good results on unsized paper, for they have very little tendency to fix themselves on the same without assistance. In using acid colors the character of the sizing in the paper is of paramount importance, a fact which will receive attention later, not only as far as the fastness of the union of dye and fiber is concerned but also from the standpoint of the color tones produced. Rosin size has been found to be a suitable sizing material for bleached stock which is to be dyed with an acid color. It is possible to use acid and basic colors in combination in the same beater. The back-waters produced under these conditions possess very little color, for the two classes of dyestuffs exert a reciprocal precipitating action on each other.

Importance of the Sizing

It is evident that the materials that are mixed with the paper fiber may have a more or less potent effect on the behavor of the dyestuffs. They may fix the dye more firmly to the fiber and thus have a beneficial effect or they may precipitate the dyestuff in such a manner that it does not adhere to the fiber at all. It therefore follows that in the manufacture of colored paper, it is of essential importance that the sizing be selected with respect to the character of the color employed, and vice versa that the dyestuffs be chosen so as to give the best results with the particular sizing material used. In other words there are two variables and these must be adjusted with respect to each other to produce a properly colored paper.

It has been found that rosin size acts most favorably in the greatest number of cases and of all sizing materials it is perhaps the best that can be used on paper that is to be colored. Sulphate of alumina has a similarly good effect but on the other hand bisulphate of soda, which is sometimes employed in the place of sulphate of alumina, does not. For example, this size precipitates the dye on the fiber in a loose held condition, which is easily washed out. Furthermore the precipitating action is not complete with the result that colored backwaters are obtained. The same poor results are secured in dyeing sodium bisulphate sized papers with substantive dyestuffs. The combined use of rosin milk and sulphate of alumina is very desirable in the manufacture of colored papers, for not only is the dye fixed more firmly to the fiber thereby, but the tone of the color is unaffected as well. This is an important consideration when matching colors, as is commonly required in colored paper making.

Fillers and Their Relation to the Colors

The relation between the filler used in the paper and color obtained with the dyestuff is a very important one, although most colored paper manufacturers may not be aware of this fact. There is an intimate connection between the two and the selection of the proper filler to be used in paper that is to be colored is of just as great significance as the choice of the paper sizing material. As far as the latter is concerned, it is rather a fortunate thing that sizes for paper making are not numerous and that rosin size enjoys such universal use. But in the case of fillers, the situation is different for there are many common, cheap fillers that are used in paper making and in many instances rather indiscriminately. But in order to make a good grade of colored paper, the character of the filler used must receive proper attention. The most common fillers are china clay, kaolin, alumina, talc, asbestine and blance fixe. The chemical properties of these substances must be ascertained, particularly whether they react acid or basic. Thus those known as acid silicates should be employed with basic and substantive colors, for they have been found to absorb these dyestuffs most readily, while they behave poorly with acid dyes in this respect. Asbestine has been claimed to give the best results of all the acid silicates. Neutral barium sulphate, on the other hand, gave the poorest absorption results with all classes of dyestuffs.

When the acid silicates and blance fixe are used with basic and substantive dyestuffs, the coloring in the paper is permanent, but when they are used with acid dyes, the color can be easily washed out

again with water. Whatever the exact nature of the combination of the coloring matter and the filler, and various opinions are held regarding the same, some deeming it a chemical phenomenon and others a purely physical action dependent on the ability of the filler to form colloidal solutions, the fact remains that in selecting the dyestuffs for dyeing the paper, consideration must be given to the kind of filler employed in the paper. Thus it is very bad practice to use acid dyestuffs for coloring paper, loaded with acid silicates. Basic and substantive dyes are much more preferable. Similarly it is well not to use blance fixe at all in papers that are to be colored with dyes.

Condition of Water

Still another important factor is the condition of the water that is used in the beater. When the water contains finely divided vegetable impurities, no bad effect can be remarked, but when the water is hard and contains mineral impurities, then the effect can be much more serious. For instance, if the water contains appreciable quantities of magnesium chloride, it is possible for the magnesium sale to form an insoluble precipitate with the dyestuffs, used in the paper coloring processes. This usually takes place with the acid and substantive dyes, and color lakes are accordingly formed which have dull shades. This is one of the principal causes of spotty colored paper and irregular distribution of the coloring matter. Furthermore the consumption of dyestuffs is increased out of all proportion. It is important as well that the water used in the factory be as free as possible from all organic matter, humic acid and iron salts.

Further Relation Between Dye and Filler

It has been pointed out above that the character of the filler is of great importance in the selection of the dye. The manufacturer of colored paper must always take this fact into consideration; otherwise, he may obtain badly colored paper or a product from which the color can be easily washed out. There is moreover another important connection between the fastness of the color and the filler. The composition of the dyestuffs and the size of molecular particles are significant factors in obtaining fast colors with certain fillers. Thus it appears that only the dyestuffs of the most complicated structure and the greatest molecular weight can be used to produce fast shades with the acid silicate fillers. This applies particularly to the basic and substantive dyestuffs.

Coloring and Weighting Paper in One Operation

Inasmuch as the relation between the weighting material and the coloring matter is such an intimate one, it is not strange that attempts should have been made to carry out the two operations simultaneously and by the selection of the proper materials obtain a colored paper which is perfect in every respect, possessing none of the disadvantages of ordinary colored paper. Experimental work of importance has been done on this problem, particularly by the German paper technologist, Emil Heuser. In making his experiments, Heuser produced in the paper fiber a large number of different filling materials which have not been used for this purpose up to the present time.

In this process the dye is mixed with the fibers in the beater and a solution of silicate of soda, water glass, is added. After the paper stock has been thoroughly incorporated with these substances, the precipitating agent is added. This is generally sulphate of alumina, and results in the precipitation of a colored gel. of silicate of alumina on the paper fibers. This gel. serves both to color and to add weight to the fiber. It also has a certain sizing action. Other silicates can be precipitated by using salts of calcium, magnesium, such as chloride of calcium and sulphate of magnesium. The experiments were eminently successful and processes have been patented based on them. It was found that the precipitating action of the chemicals was very complete, with the result that only a little dye and chemical were left behind in the back-water. The dyes are precipitated as silicate lakes and are absorbed by the paper fibers in this form. Another important advantage that has been noted in this combined weighting and coloring process is that the paper pulp, coming from the beaters, does not have the milky turbidity which is often obtained in the regular mass coloring process, when fillers are used.

It was proven furthermore that the dyed silicate lakes were fast and could not be washed out by the ordinary treatment with water. The colors were also fast to alcohol and to light. It was also found that when a mineral size was used, better coloring of the paper was obtained. The acid silicates, kieselguhr and amorphous silicic acid behave very well with the basic dyes. In this process of combined weighting and coloring of paper, the acid dyestuffs are not so suitable for this purpose. When aluminum hydroxide is used, the opposite results are obtained, as this is only very slightly dyed by the basic dyestuffs while it is very effectively dyed by the acid dyestuffs. Of all the fillers used in the combined weighting and coloring process, aluminum silicate gave the paper with the deepest color.

Some New Developments in Coloring of Paper

The German paper companies have been paying a great deal of attention to the dyeing and coloring of paper, and in this work they have had the support of the large dye manufacturing companies, particularly the Farbewerke vorm. Meister Lucius &

Bruening. Some of the most recently developed processes are concerned with the dyeing of paper in the beater, so-called mass dyeing, others with the application of the dye on one or both sides of the paper in the form of a web. Still others are concerned with the production of combined marbling and colored effects in the paper, making paper with colored stenciled designs, coloring paper and producing designs on the surface by the use of differently colored paper pulp and the manufacture of other novel colored papers. All these processes are of interest to the colored paper maker, but for want of space they cannot be described in detail here. However, a short description of the more important developments will be given.

Coloring Paper with Color Rolls

This process is specially designed for making papers that are used in printing revenue stamps, documents, postage stamps, etc. Such papers often have colored lines or designs on the surface. These designs are usually traced on the surface of the wet paper web in the time that it passes from the couch roll to the first dyeing cylinder and the coloring apparatus is generally installed at that point in the paper making machine. The color is absorbed into the paper before dyeing commences and the result is that the colored lines appear faint and seem to lie within the fibrous structure of the paper rather than on the surface. The particular feature about this process is that the color is applied to the wet web so that a faint effect is obtained.

The Lucius and Bruening Company have a process for coloring paper in full colors by means of color rolls or cylinders. The dyestuff solution is allowed to flow over a rotating cylinder and the same is then brought into contact with the paper web. The dyestuff solutions may contain glycerine, acetic acid, gums, casein and other similar substances. Generally emulsions are used. An even colored effect can be obtained or an irregular effect may be secured by oscillating the color-applying device. Etched rolls may be used to produce design effects. The process can be used in coloring both the wet and dry paper web. Finished paper can be colored by the process, if the surface of the same is made properly absorbent by moistening. It is possible to use one of the drying cylinders in the drying part of the paper making machine as the color roll or else a special color roll may be provided.

Producing Variegated Color Effects

One method of producing variegated colored designs on the surface of papers is to allow colored solutions to flow over the paper pulp on the wire. The waste water in this case will contain considerable quantities of the coloring matter and hence has to be used over again to conserve the same. The coloring matter precipitates in the depressions in the paper with the result that these parts are more deeply colored than the rest of the paper.

Colored designs are produced on both sides of the paper by causing the same to pass between etched rolls whereby the design is impressed on the paper by the aid of alcohol, acetic acid, formic acid or other fat solvents. The paper then goes through the dye bath and the color is absorbed by the paper in such manner, due to the way in which the designs are impressed thereon, that the two sides of the paper emerge from the dye bath with the identical designs colored in the same manner on both sides of the paper without the coloring matter penetrating into the internal structure of the paper at all.

Colored designs are also produced on papers by making two different paper webs and causing them to be superimposed one on the other. One of the webs possesses the same design that is embossed on the other web but cut out like a stencil so that the design on the under web sticks through and the two webs together form a solid single sheet of paper. In another process both acid and basic dyestuffs are used in a common solution and are prevented from exerting their reciprocal precipitating effect by the addition of protective colloids.

Vessels of Pulp and Hard Paper

WHILE in former years the material for vessels was wood, metal or clay, attempts have been made in the last few years to use hard paper, hard cardboard and pulp for the same purpose. Vessels are made in quantity production with the help of special machinery, paper machines, hydraulic press pumps, winding machines and iron moulds. Either the pressing process is employed or the pulp is wound round a corresponding core and impregnated with suitable materials. Of course the vessels can be made of cardboard too, and the joints are fastened the same as is done with boxes, or they can be pasted over. On the other hand, a seamless cylinder open on both sides, fitted with longitudional folds is placed into a cylindrical or conical mould with domed bottom, and is driven by a stamp of calotte shape into an equally hollowed out die. The lower cylinder end is put into a domed tapering mould. At last these vessels are transferred into a second die with flat bottom into which a stamp with even front is driven. Thus the wooden bottom of the vessel is pressed into a plane, is smoothed, after which the central opening is fully closed. The manufacturing process may seem simple, but experiments had to be made for several years to find out a really reliable process fulfilling both technical and economical requirements.

In some countries bottles made of woodpulp saturated with parafin are employed for milk transportation. When machines are used, three workmen are able to turn out 5,000 bottles an hour. The sub-

stance needed for these bottles is a thick wood paste of which one ton suffices for 600,000 bottles. Into the raw paste a steel core is dipped, which after being taken out is turned three times around its axis and is pressed together with a pair of tongs. Bottom and cover are made and pressed on by another machine. Although it is quite possible to also manufacture non-cylindrical vessels, viz: barrel-shaped, it is mostly not done; cylindrical ones are preferred. They can be made quicker and require less expensive arrangements. Impregnating is done with asphalt, sulphur, resinous substances, parafin, barrel-lacquer, etc. Finally the whole is coated with a cellulose mixture.

The vessels thus produced are excellently adapted for packing any kind of food. The bottles are mostly thrown away after being used once and serve for sending beer, mineral water and practically any drinkable liquid. What has been done with jars and bottles can also be done with dishes, moulds, tins, boxes, tubs, etc. The advantages of such paper vessels are the absence of seams and folds, low weight, absolute tightness, almost unlimited wear, and they are not affected by heat or cold. Shrinking by drying and oxydizing is also impossible.

Power Plant Management

Efficient Combustion Practice—Combustion Losses and How to Minimize Them

By ROBERT JUNE, M. E.

This is the second in a new series of articles by Robert June, the well known authority on Power Plant Management. The articles are written from the point of view of the managing executive and deal with the dollars and cents end of power plant operation and maintenance. Succeeding articles deal with such live topics as Safe and Efficient Boiler Operation, Stoker Operation and Maintenance, What Management Should Know about Coal and Ash Handling Equipment, Steam Piping, Efficient Turbine Operation, etc. The series is timely and should prove of value to our readers.

THE place to begin to save dollars in power plant operation is in the boiler furnace. Here we have opportunity to effect, not only greater proportionate savings, but larger actual savings in money, from an operating standpoint, than anywhere else in the power plant. Efficient combustion practice is fundamental to the economical production of power.

Chemistry of Combustion

Combustion is supported solely by oxygen and a combustible therefore is an element or compound which will combine with oxygen. Table I. comprises the principal elements and compounds encountered in the combustion of coal, and shows the chemical reactions which take place. The ignition temperatures of the combustible constituents of the coals commonly used in boiler practice are also given in Table I.

Air, a chemical mixture of oxygen, nitrogen, and slight traces of carbon dioxide, water vapor, argon, etc., is for the purpose of combustion considered to be proportioned as follows:

	By Volume Per Cent.	By Weight Per Cent.
O_2	20.91	23.14
N_2	79.09	76.85

The nitrogen in the air is a source of direct loss in combustion since it absorbs heat in its passage through the furnace. It is a further source of loss since space must be provided in the furnace, boiler passages, and chimney for its accommodation, which would not be required if pure oxygen could be supplied to the fuel.

The B.T.U. value of the various elements and compounds listed in Table I. is given in Table II. This Table shows vividly the difference in heat produced between burning one pound of carbon to carbon monoxide (CO), and burning the same carbon to CO_2. Nearly three times as much heat is produced in the latter case. High production of CO_2 then is essential to high combustion efficiency.

In studying Tables I. and II. it is well to remember that the heat value in the boiler furnace is dependent upon the final products of combustion, and that intermediate combinations which may have occurred, have no bearing upon the ultimate result.

The chemical composition of typical fuels with which we have to deal is found in Table III.

Air Required for Combustion

The terms "perfect combustion" and "complete combustion" are frequently confused. Perfect combustion would result if all of the elements and compounds in the fuel were to be combined with oxygen which would be supplied in such proportions that all of the oxygen would be utilized. In distinction from this, complete combustion results from the oxidation of all of the elements and compounds, but it does not imply that all oxygen supplied is utilized. With

TABLE I

ELEMENTS AND COMPOUNDS ENCOUNTERED IN COMBUSTION

Substance	Atomic Weight	Molecular Weight	Reaction	Ignition Temperature Degrees F.	
Carbon, C	12	...	(to CO) $2C+O_2=2CO$ (to CO_2) $2C+2O_2=2CO_2$	(Fixed Carbon Bituminous) (Fixed Carbon Super Bituminous) (Fixed Carbon Anthracite)	766 870 925
Carbon Monoxide, CO	...	28	$2CO+O_2=CO_2$		1210
Carbon Dioxide, CO_2	...	44	.....		.....
Sulphur, S_2	32	64	(to SO_2) $S+O_2=SO_2$ (to SO_3) $2S+3O_2=2SO_2$		470
Sulphur Dioxide, SO_2	...	64	.....		.....
Hydrogen, H_2	1	2	$2H_2+O_2=2H_2O$		1130
Hydrogen Sulphide, H_2S	...	34	$2H_2S+3O_2=2H_2O+2SO_2$		....
Oxygen, O_2	16	32	.....		....
Nitrogen, N_2	14	28	.....		.....
Methane, CH_4	...	16	$CH_4+2O_2=CO_2+2H_2O$		1202
Acetylene, C_2H_2	...	26	$2C_2H+5O=4CO_2+2H_2O$		900
Ethylene, C_2H_4	...	28	$C_2H_4+3O_2=2CO+2H_2O$		1022
Ethane, C_2H_6	...	30	$2C_2H_6+7O_2=4CO_2+6H_2O$		1000
Water Vapor, H_2O	...	18	.....		....
Air, ——	...	29	.....		....

"perfect combustion" there would be no boiler losses. With "complete combustion" boiler losses occur because of the presence of excess oxygen.

A real measure of the efficiency of combustion is found in the relations existing between the amount of air theoretically required for the burning of fuel and the amount of air actually supplied for such combustion. Table IV. gives the theoretical air requirements of the various constituents of the coal. Table V. shows the theoretical air requirements for various fuels and the resulting maximum percent of CO_2 in the flue gas or complete combustion.

TABLE II

HEAT OF COMBUSTION

By Calorimetric Determination

Combustible	B.T.U. per Pound	B. T. U. per Cubic Foot
Hydrogen	62000	348
Carbon (to CO)	4380	....
Carbon (to CO_2)	14540	....
Carbon Monoxide	4380	342
Carbon in CO	10160	....
Methane	23850	1073
Acetylene	21460	1590
Ethylene	21450	1675
Ethane	22230	1883
Sulphur (to SO_2)	4050	....
Sulphur (to SO_3)	5940	....

Combustion Losses

In order to utilize all the heat of combustion a boiler would have to be free from radiation and leakage losses, the coal completely oxidized, and the products of combustion discharged at atmospheric temperature. Commercially such conditions are unobtainable. A boiler which is operated constantly at eighty per cent over-all efficiency is extremely good practice. The various losses which occur in combustion, including the heat utilized by the boiler, constitute the "Heat Balance." The losses considered are:

1. Loss due to moisture in the fuel.
2. Loss due to hydrogen in the fuel.
3. Loss due to moisture in the air.
4. Loss of fuel through the grate.
5. Loss due to incomplete combustion.
6. Loss through the dry chimney gases.
7. Loss due to unburned fuel carried beyond combustion chamber.
8. Radiation and unaccounted for losses.

These will be considered separately.

Loss Due to Moisture in the Fuel

Moisture in the fuel represents a very definite loss. It must be brought from atmospheric temperature

TABLE III

COMPOSITION OF TYPICAL COALS

Ultimate Analysis

	Carbon	Hydrogen	Nitrogren	Oxygen	Sulphur	Ash	B. T. U. by Calorimeter
ANTHRACITE:							
Treverton, Pa.	90.66	1.73	....	0.78	....	6.83	13,980
Wilkesbarre, Pa.	88.86	2.04	0.90	1.95	0.35	5.90	13,950
Drifton, Pa.	87.70	2.56	1.03	2.26	0.56	5.89	14,217*
Lehigh, Pa.	85.66	2.78	0.77	2.87	0.64	7.28	14,038*
SEMI-ANTHRACITE AND SUPER-BITUMINOUS:							
Bernice Basin, Pa.	85.46	3.72	1.12	3.45	0.91	5.34	14,552*
Coalhill, Ark.	76.44	3.82	1.37	4.30	1.99	12.08	13,259
Pocahontas, W. Va.	76.51	4.27	1.00	6.59	0.51	11.12	13,509
Kanawha Series, W. Va.	81.95	4.30	1.29	3.68	0.97	7.81	14,686
New River, W. Va.	82.87	4.76	1.68	4.99	0.65	5.05	14,807
Clearfield, Pa.	80.32	4.88	1.46	4.69	1.00	7.65	14,432*
BITUMINOUS:							
Freeport, W. Va.	77.82	4.89	1.48	6.52	0.90	8.39	14,069
Hocking Valley, Ohio	70.86	4.70	1.53	11.45	1.79	9.67	13,053
Pere Marquette, Mich.	79.44	5.29	1.56	9.84	1.11	2.76	14,160*
Brazil, Ind.	70.50	4.76	1.36	15.66	1.39	6.33	12,417
Eastern Field, N. Y.	77.37	5.43	1.83	9.76	1.22	4.39	14,148
Horsecreek, Ala.	71.50	5.01	1.65	8.50	0.72	12.54	12,850
Fleming, Kans.	67.34	4.98	1.08	9.35	4.28	12.97	12,242
Laddadale, Iowa	59.82	4.81	0.94	13.40	5.03	16.00	11,027
Rich Hill, Mo.	57.00	4.97	0.94	12.48	5.25	19.36	10,586
Coffeen, Ill.	54.59	5.49	1.11	21.52	4.01	13.28	10,064

* Dulong's Formula.

to a boiling point of 212 degrees, and again raised from 212 degrees to the temperature of the exit gases. At times firemen turn the hose on the coal pile. This is of value only to assist coking or reduce

TABLE IV

PRODUCTS OF COMBUSTION

	Pounds per Pound of Fuel Theoretically Required		Products of Combustion Pounds				
	O_2	Air	CO_2	H_2O	N_2	CO	SO_2
Carbon (to CO_2)	2.667	11.52	3.667	....	8.85	....	....
Carbon (to CO)	1.333	5.76	....	....	4.43	2.333	....
Carbon Monoxide	0.572	2.46	1.57	....	1.89	....	....
Sulphur	1.000	4.32	....	....	3.32	....	2.00
Hydrogen	8.000	34.56	....	9.00	26.56	....	....
Methane	4.000	17.28	2.75	2.25	13.28	....	....
Acetylene	3.077	13.29	3.39	0.69	10.21	....	....
Ethylene	3.429	14.81	3.14	1.29	11.38	....	....
Ethane	3.733	16.13	2.93	1.80	12.40	....	....
Hydrogen Sulphide	1.412	6.10	....	0.53	4.69	....	1.88

dust. The theoretical furnace temperature is decreased. Wet coal will only give a higher evaporation by preventing loss through the grate, or reducing the percentage of excess air in thin fires, as a result of packing the coal better.

Don't let your firemen run wild with the hose, and watch your step in purchasing coal, to see that the moisture content is specified and that deliveries conform to the contract, or else that proper adjustment is secured for excessive percentages of moisture.

Loss Due to Hydrogen in the Fuel

The combustion of a pound of hydrogen results in the production of nine pounds of water vapor. This moisture must be heated and discharged at stack temperature. Further, since water is the direct product of combustion, the latent heat must be taken into consideration. Therefore, despite the fact that the combustion of a pound of hydrogen liberates 62,000 B.T.U., we find that the presence of hydrogen in anthracite coal causes an approximate loss of 2.5 per cent total heat value and with bituminous an average loss of 4.5 per cent of the total heat value of the fuel. This loss then can be minimized only where it is practical to substitute a low hydrogen fuel for a high hydrogen fuel, without additional cost or without affecting other factors.

Loss Due to Moisture in the Air

This is usually a minor loss, but on hot humid days, or in regions where the air is constantly surcharged with water vapor it becomes appreciable. Since the moisture content of the air must be accepted as found, the only manner in which this loss may be kept in a minimum is by the reduction of the exit gas temperatures to the lowest practicable figure.

Loss of Fuel Through the Grates

From 15 to 50 or 60 per cent of the total weight of refuse in the ash pit is combustible matter. The quantity of this unconsumed carbon in the ash in any given plant depends upon the size and quality of the coal, the type of grate, the rating at which the boiler is operated, and to some extent upon the skill of the fireman. In hand fired plants the total loss resulting from this waste of fuel has been found to range from 3 to 12 per cent or more of the total heat value of the fuel. Good stoker practice should show losses ranging from 1 per cent to a maximum of 5 per cent of the heat value of the fuel.

The only way to find out where your plant stands on this important point, is to have a series of analyses made of representative samples of ash. If you are not equipped to make such a test yourself you can send your samples to testing laboratories in any of the large cities, which will do this work for a nominal fee.

If you find that your losses are high, study the proportioning of the grate openings to the size of

TABLE V

THEORETICAL AIR REQUIREMENTS FOR VARIOUS FUELS AND THE RESULTING MAXIMUM PERCENT CO_2 IN THE FLUE GAS FOR COMPLETE COMBUSTION

Fuel, Moisture and Ash Free	Ultimate Analysis C.	H.	N.	O.	S.	Air, Pounds Per Pound of Fuel	Per 10,000 B. T. U.	CO Percent Volume
Anthracite	94.29	1.77	0.71	2.13	1.00	11.39	7.4	20.06
Semi-anthracite	89.64	3.97	0.63	3.23	2.53	11.59	7.5	20.00
Super-bituminous	86.39	4.84	1.46	5.50	1.81	11.41	7.6	18.65
Bituminous	79.71	5.52	1.52	9.87	3.38	10.70	7.4	18.46
Sub-bituminous	78.06	5.70	1.35	13.10	1.79	10.24	7.3	18.56
Lignite	70.64	4.61	1.22	22.67	0.86	8.75	7.3	19.68

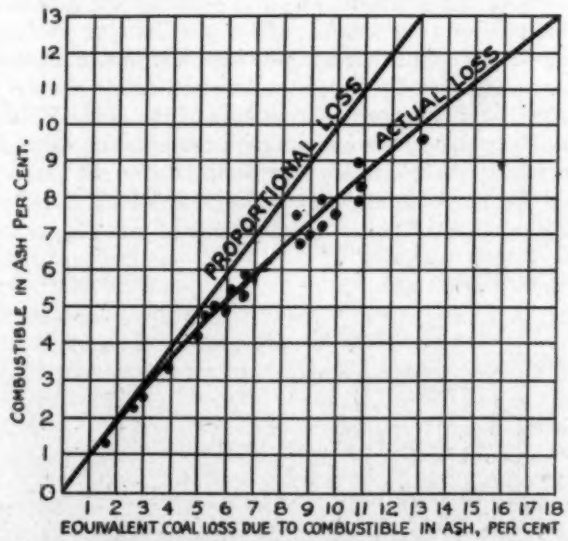

COMBUSTIBLE IN ASH PER CENT.
EQUIVALENT COAL LOSS DUE TO COMBUSTIBLE IN ASH, PER CENT
PROPORTIONAL LOSS
ACTUAL LOSS
0 1 2 3 4 5 6 7 8 9 10 11 12 13
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Fig. 1—The actual loss is greater than the proportional loss, a 5% proportional loss being equivalent to a 6% actual loss

coal burned; note further how your firemen handle the fire. You may find that your trouble is due to the use of coking coals, and that if it is practical to do so you will greatly reduce your losses by the substitution of free burning coals. With chain grate stokers an appreciable percentage of fine fuel may fall through the front end of the grate, and in such event it is possible to install a special hopper in the ash pit at this point to salvage the lost fuel.

Loss Due to Incomplete Combustion

The difference between the burning of a pound of carbon to CO and burning it to CO_2 has been shown to be (See Table IV.) 10,160 B.T.U. A very small percentage of CO in the flue gas is therefore fatal to high boiler efficiency. The extent of losses resulting from the presence of CO in the flue gas is shown graphically in Figure 2.

Carbon monoxide being a colorless gas, its presence in the chimney gases cannot be detected by the absence of smoke. A clear stack does not indicate perfect combustion. If you find that you are running high percentages of CO look first to the method of handling the fire on the part of the firemen. Then check up your furnace design. Remember that if ample combustion space is not provided the volatile gases will be brought in contact with the boiler surface before combustion is complete, and the CO being thus reduced in temperature, may fail to unite with the oxygen to form CO_2.

Loss in the Dry Chimney Gases

This is usually the greatest of all the losses. In even the best practice this loss is usually not far

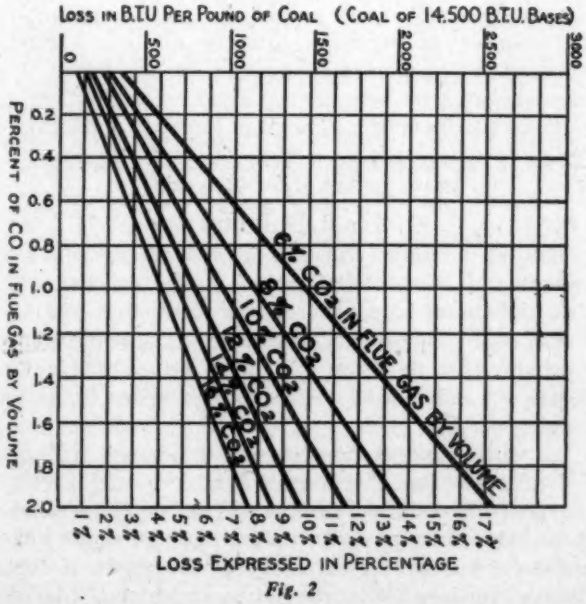


Fig. 2

from 12 per cent with a general average of from 20 to 25 per cent. The size of the loss arises in the fact that stack temperatures less than 450 degrees are seldom found except in connection with economizers, and that temperatures of 600 to 700 degrees are by far more common. Figure 3 shows the amount of heat carried away under varying conditions.

The quickest way to reduce this loss is by the installation and regular use of mechanical soot blowers.

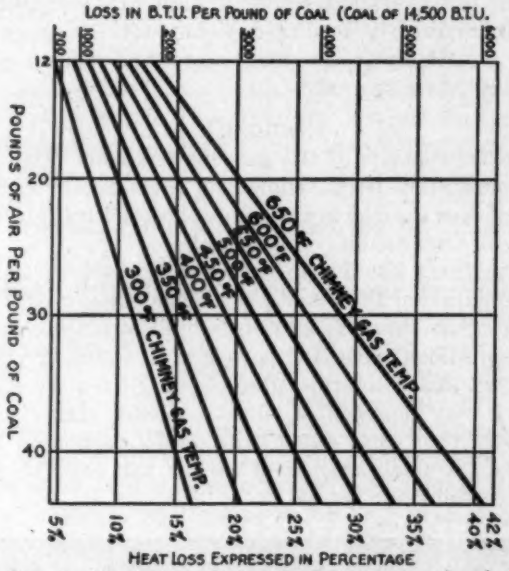


Fig. 3—Amount of heat carried away in the dry chimney gases

Put in soot blowers and you will find your stack temperatures reduced 60 to 100 degrees with a consequent direct saving in fuel of from 3 to 5 per cent.

Next cut down the amount of excess air admitted to the furnace to a minimum. Eliminate air infiltration by providing absolutely tight boiler settings. And finally keep the boilers free from scale so that they will readily absorb heat.

Loss Due to Unburned Fuel Carried Beyond Combustion Chamber

When large quantities of unconsumed particles of carbon are deposited beyond the bridgewall, the fault is usually due to improper furnace design or to improper draft conditions. The fuel should be burned before it leaves the combustion chamber. If it is not the situation demands a special study of plant conditions.

Radiation and Unaccounted for Losses

These losses, which it is practically impossible to measure, include: 1. Radiation loss, which varies with the size of the furnace and boiler and condition of the setting. Careful tests on properly designed boiler furnaces show that the radiation loss in the very best practice does not exceed 2 per cent. 2. Losses due to unburned volatile hydro-carbons. 3. Loss due to the combination of carbon and moisture, with the consequent formation of hydrogen, ($C+H_2O=CO+H_2$), which may or may not be burned. This action may occur when wet fuel is thrown on an incandescent fuel bed.

The test figures of 2 per cent radiation and unac-

counted for losses can be approximated in the average boiler plant. Unfortunately these losses are usually sadly neglected. They are frequently found to amount to as much as 10 or 15 per cent due primarily to leaky boiler settings, as well as cinders blown out the stack under a high draft pressure. With improperly insulated boiler settings there is just one thing to do—build the walls thicker and insulate them properly.

Smoke

Smoke consists of the gaseous and solid products of combustion both visible and invisible, including substances carried in the atmosphere with the products of combustion.

The direct loss due to visible smoke is very small. Compilation of the results of a large number of tests shows that this loss as represented by unconsumed carbon seldom exceeds 1 per cent. It is the invisible and practically colorless gases issuing from the stack which may represent combustion losses many times greater than that due to the actual carbon in the gases. A small amount of carbon will color an immense volume of gases.

Fig. 4—To reduce flue gas temperatures, use mechanical soot blowers. (Illustration, courtesy of Diamond Power Specialty Corporation)

As a matter of fact a smoky chimney may indicate a much more efficient furnace than one which is smokeless, due to the fact that a furnace operating with a minimum air supply may cause dense clouds of smoke, and still give a higher evaporation than one made smokeless by a large percentage of excess air.

The loss due to unconsumed or partially consumed volatile hydro-carbons though not evident from the color of the gases issuing from the stack, may represent a very appreciable percentage of the total fuel fired. The way to determine this loss and to minimize it is by constant anaylsis of flue gas and by the application of remedies suggested by the results of such analysis.

TABLE VI

PERCENT OF CALORIFIC VALUE OF COAL AS FIRED

Heat absorbed and losses itemized	Highest attainable Efficiency	Excellent practice	Good practice	Average practice	Poor practice
Heat absorbed by boiler	89.86	80.0	75.0	65.0	60.0
Loss due to free moisture in coal	0.50	0.5	0.6	0.6	0.7
Loss due to hydrogen in coal evaporation of H_2O	4.20	4.20	4.30	4.3	4.4
Loss due to heat in dry flue gases	5.33	10.0	13.0	17.5	20.0
Loss due to carbon monoxide	0.00	0.2	0.3	0.5	1.0
Loss due to combustible in ash and refuse	0.00	1.5	2.4	4.5	5.5
Loss due to heating moisture in air	0.11	0.2	0.2	0.3	0.4
Loss due to unconsumed hydrogen, hydrocarbon, radiation and unaccounted for	0.00	3.4	4.2	7.3	8.0
Calorific value of coal	100%	100%	100%	100%	100%

Stand-By Losses

Stand-by losses include: (a) heat lost in shutting down boiler; (b) coal required to start up cold boilers; (c) fuel required in banking fires; (d) heat lost in "blowing off" and cleaning boilers. Depending upon the size and character of the boiler equipment and the conditions of operation stand-by losses will range on the average from 5 to 15 per cent or more of the total heat generated over the period of a year. This means that if your boiler normally operates at an efficiency of 70 per cent for example, that its actual efficiency over a period of a year is probably not to exceed 60 per cent. Bearing this fact in mind, efficient power plant management demands that the closest watch be kept on the detail of taking off or putting boilers on the line. It is better to work three boilers continuously at a high rating if this can be done, than to work four intermittently.

Heat Balance

The heat balance consists of a chart on which a summary is made of the various losses together with the amount of heat absorbed by the boiler. It is a bookkeeper's device, very valuable to the power plant operator, for it shows him at a glance where his losses are and thus in itself suggests means for minimizing them.

A representative heat balance is shown in Table VI. To the operating man this table is of value for purposes of relative comparison only. The actual heat balance for any given plant must be worked out on the ground, with reference to the grade of fuel, type of furnace and grate, rating at which the boiler is driven, and similar factors.

Improving the efficiency of a boiler plant is a man-size job. It requires enthusiasm, patience and persistence, but given these the reward is certain.

Methods of Maintaining Interest in Safety

By J. M. SANDEL, Safety Engineer
National Safety Council

MOST any project is much easier to start than to continue. Success in any enterprise almost invariably results from the efforts made to sustain the work and to present it continually before all persons so that it will be welcome. This is indeed true of accident prevention work. Many safety campaigns have started out full of promise and reasonably certain of great expectations for reductions in accidents and compensation costs. Everybody interested was very enthusiastic; but the great trouble with many that did not attain results was that they "ran out of gas."

The old-time safety engineer has learned by bitter experience that he must everlastingly keep at it, and that he must do something besides hold meetings occasionally with the plant personnel, post bulletins and provide safeguards for machines. He soon discovers that the job requires an intimate knowledge of everything going on about the plant and that he must possess the abilities of men of half a dozen different occupations and professions. Since a man of such versatile talents and accomplishments is often hard to find, it is natural that he could turn to outside agencies and other men in the organization for assistance.

Safety work needs advertising. The company's advertising department is one place where the safety engineer can get some help in this work. This is especially desirable when safety department needs posters or various printed matter. The advertising department can assist very much in making attractive lay-outs and further help with art work or drawings, etc.

It is often desirable to know the personnel of the plant intimately. Good amateur photographers, budding artists and cartoonists, and expert sign painters can be used advantageously many times by the safety department. The small plant very often must rely upon these persons for assistance in making their own bulletins and having signs made. A large plant usually has no difficulty; there are organized departments where this work is regularly done.

When intensive safety work has been decided upon by the management, a bulletin board should be provided, bulletins obtained from one or several sources, and committees appointed. These are the requirements of compensation insurance companies, and are the necessary tools to work with. In some instances, it has been found satisfactory to get along without any committee, but some other provision must be made within the organization. The idea is not a good one, because the psychological reaction of giving men some work to do stimulates the interest in safety work in a large number within the plant instead of only a few.

How the Bulletin Board Can Be Made Attractive

Safety departments should regard the bulletin board as the advertising department regards a newspaper or magazine. It is a medium by which the goods are sold to whoever reads it. Therefore, the board must be attractive. It will not increase the success of the safety movement within a plant to have a board covered in a haphazard way with bulletins of all kinds, some of which have been up ever since the board was installed, but the arrangement of the bulletins should be changed often so as to give the board a new appearance. Invariably, the universal safety emblem and the plant safety emblem, if there is one (something including the company's trade-mark is desirable), should be permanent fixtures on it. The colors of the board should be attractive, and green and white have been the most popular because of their association with the safety movement. A glass cover for the space used for bulletins is desirable in order to avoid mutilation or theft of bulletins. The board should be well lighted at all times, and should be kept clean. Study the space for posting to see how many different ways bulletins can be posted on it. Post only safety bulletins on the board, leaving general plant notices for another board. Occasionally leave the board blank for one day before changing bulletins. It attracts attention, and the workmen will watch for the new bulletins.

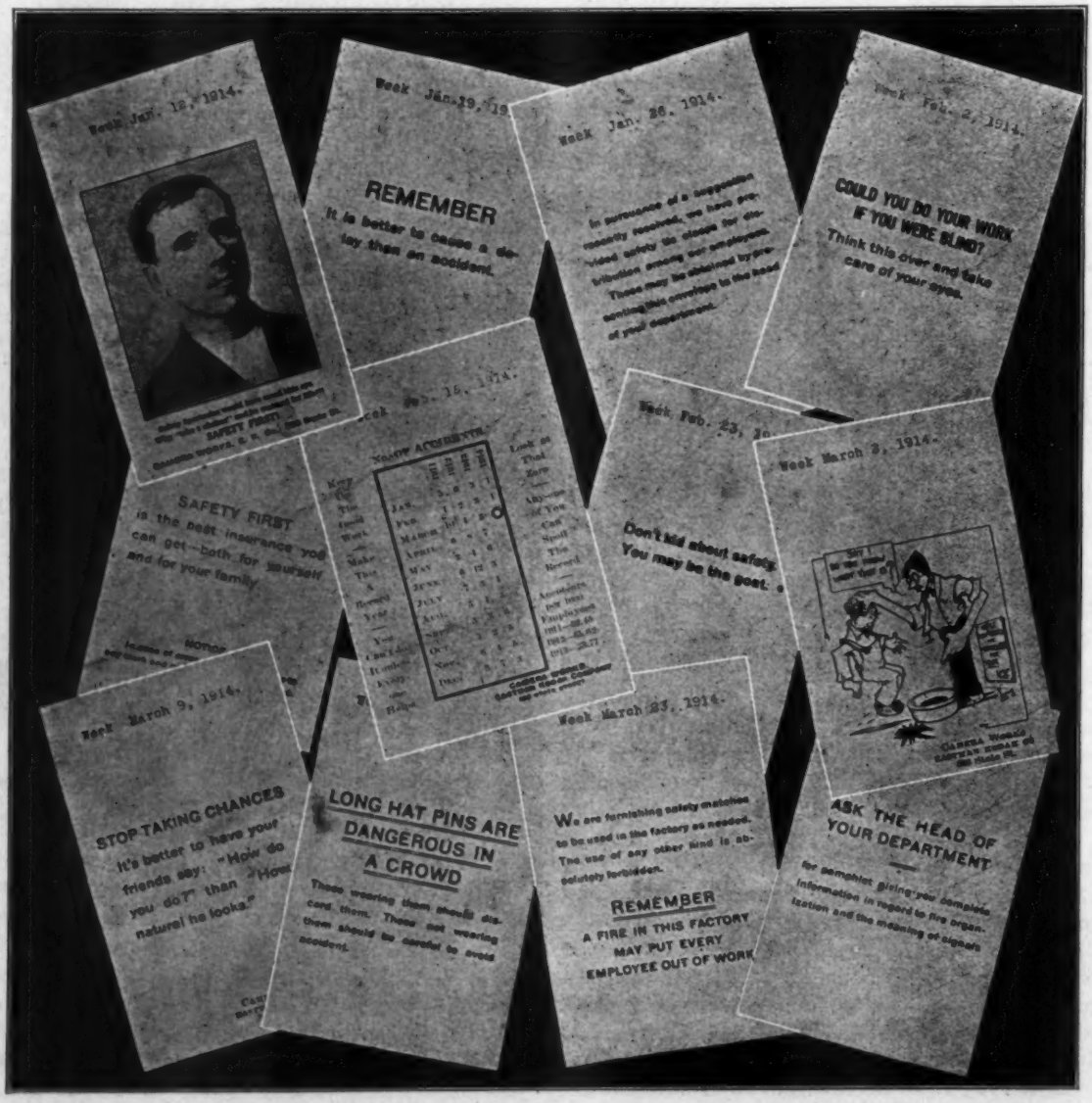
Bulletins are the safety man's best assistant. By means of them, he can speak about safety to everyone all at once. It is therefore essential that the bulletins be saved and used a second time where possible. This is especially true of those bulletins which show safe and unsafe ways of doing some work. Where the pictures show conditions as they are in the particular plant, the bulletin is, or should be, a valuable aid to the production department, provided they approve and enforce the story told on the bulletin.

Home-made bulletins are a big help to the safety department when they are well composed. Workmen are very critical of the things that are posted for their benefit, so the art work on the bulletin should be of a good grade and the picture itself without any flaws such as undesirable conditions. After safety

has been conducted in a plant a long time, workmen are very quick to notice conditions pictured which are contrary to good safety. But they will be readily attracted to pictures of scenes that they are familiar with, showing some of their fellow workmen. Sometimes it is hard to secure the assistance of a man to pose for a photograph, but if it is explained to him that his assistance may be a means of preventing a serious accident to someone in the plant, he very readily assents.

As a variation from bulletins, a chalk or crayon drawing on a blackboard is good. Goggles that have been broken in service, hand tools in an unsafe condition or which have caused accidents, unsafe clothing that has been caught in machinery or cause some other kind of accident; all these, together with the story of the accident make an effective exhibit to replace the bulletin occasionally. Then the foreman's help should be secured in order to remind unsafe workers of what may happen to them, and call their attention to the bulletin board.

Post accident records on the bulletin board and in conspicuous places. It is a good idea to post records for the entire plant by departments in each department and keep the men informed of progress. Possibly a standard form of chart should be used, but the method of displaying this chart can be different each time it is used, or when it is brought up to date at the end of any given period. Many companies have found posting of accident records of different


Week Jan. 12, 1914.
REMEMBER
It is better to cause a delay than an accident.
Week Jan. 26, 1914.
COULD YOU DO YOUR WORK IF YOU WERE BLIND?
Think this over and take care of your eyes.
SAFETY FIRST
is the best insurance you can get—both for yourself and for your family.
Week Feb. 23, 1914.
Don't kid about safety. You may be the goat.
Week March 9, 1914.
STOP TAKING CHANCES
It's better to have your friends say: "How do you do?" than "How natural he looks."
LONG HAT PINS ARE DANGEROUS IN A CROWD
These wearing them should discard them. Those not wearing them should be careful to avoid accident.
Week March 23, 1914.
We are furnishing safety matches to be used in the factory as needed. The use of any other kind is absolutely forbidden.
REMEMBER
A FIRE IN THIS FACTORY MAY PUT EVERY EMPLOYEE OUT OF WORK
Week March 9, 1914.
ASK THE HEAD OF YOUR DEPARTMENT
for pamphlet giving you complete information in regard to fire organization and the meaning of signals

The above is a reproduction of pay envelopes used by the Camera Works Division of the Eastman Kodak Co., from January 12th to April 1st, as a part of the Safety Educational Campaign. During the first six months of 1914 the accidents decreased 56 per cent over the same period of the previous year

departments of an entire plant to arouse considerable interest when presented to the men in the form of a horse race, bull's eye, or other attractive graph which could include some object or association with the business; for example, a boat race for a shipyard.

It is often desirable to post bulletins rather than warning signs at individual machines. Very often the bulletin can be a warning sign as well. If the bulletin shows the safe and unsafe ways to operate, it should help production, and the management should have less trouble in enforcing the safety requirement. For construction work, it is often a good idea to post bulletins on the inside covers of tool boxes. Another excellent place to post them is somewhere on the body of trucks used inside the plant. One company utilizes a truck occasionally as a traveling bulletin board—a very good idea where a special No-Accident Week is being held.

The Plant Magazine

The safety department should be responsible for definite space in the plant magazine. This should be opened to their use as they see fit, but they will very likely use it for inspirational subject matter. Here is an opportunity to give publicity to personal items that cannot very well be used on a bulletin board. The plant magazine goes home in nearly every instance, and the safety message thereby goes with it.

Many companies print safety slogans at the bottom of every page of their plant magazine. These slogans are relatively easy to obtain, and can often be secured locally by offering a price for good slogans in connection with a safety campaign. In that way the safety message gets to all departments, for these slogans are invariably read while there may be a tendency to pass over the safety page by some persons.

When accident records are published in a plant magazine, they become a permanent record to everyone. While this is more or less true if the records are posted on bulletin boards, men are more apt to refer to the publication of records in the plant magazine frequently. If any explanation of a chart is needed, the magazine is the best place to make it. Men often read the magazine at a time when they can feel free to go over each article carefully, which is not the case when anything appears on the bulletin board.

Members of the safety committee, the foremen, and injured men should be solicited for stories for the plant magazine. Often, these stories would be a part of the safety page or department of the magazine. They furnish excellent material, for the local color that they can portray is always desirable. Excerpts from minutes of committee meetings can very often be advantageously used.

Safety Committees

Whatever the form of safety committee (general, departmental, foremen's, or workmen's), they should not be allowed to "go stale." At their inception, they should be guided along the right lines, so they will get results. The management could grant or approve all recommendations that are reasonable, and any recommendations that are not approved should be returned to the committee with the reasons

for non-approval. The presence of a representative of the safety department, and the plant manager occasionally, will give the committee an inspiration to continue their work and take an interest in it. Their work should be as definitely planned as possible and carried through to a successful conclusion. If any outside help is needed, this can often be secured through the National Safety Council, and representatives of insurance carriers and state labor departments. This will help keep them "out of a rut" and at the same time make their work interesting. Occasional dinner meetings of committees change any monotony, and can be made the occasion for injection of new inspiration. In some plants, the management awards something to committee members who do

good work. This often takes the form of a button with a safety emblem on it or a home first aid kit. The actual value of such a gift is small, but its intrinsic value is large.

The committee should preferably concentrate on the safe operating practices. This will increase efficiency as well as promote safety. Many accidents occur that cannot be prevented by the use of safeguards, and therefore it is necessary that the individuals be properly instructed in safety. The committee can furnish this instruction after they study the safer way to perform the work. Their conclusions, after approval by the operating departments, should be the procedure for the various operations. Bulletins should be issued illustrating the committee's work for assistance in instructing men. It is in this field of safety that the safety committee can do their best work.

Investigation of accidents always requires attention by the committee. Oftentimes, this work is done entirely by the committee and a formal report rendered. It is also, in some cases, required of the safety department and the foreman of the department involved, but the report of the committee, especially if it is the workmen's committee, is valuable. In some plants, the safety committee acts as a jury in deciding who or what was the cause of an accident.

The work of the committee can be very nicely supplemented by a suggestion system. All employees should be urged to suggest any changes which will provide safer working conditions. Suggestions can come before the committee for approval and passed on to the management with the comments of the committee. Sometimes it is advisable not to have the name of the person making a suggestion appear on the suggestion when presented to the committee, in which case blank forms should be provided with numbers, with a coupon which can be torn off by the person making this suggestion. If any rewards are offered, they would be offered by number and the person holding the number could collect his award. This method has often overcome petty jealousies and prejudices.

Various Meetings

Safety work cannot be very easily conducted without holding some meetings. Personal contact is a big factor, but this should follow meetings held occasionally. It is not advisable to have meetings of all employees of a plant very frequently unless a good program has been planned, and motion picture films, lantern slides, blackboard talks, etc. have been arranged for. Something besides a speaker is needed to have a good attendance. A meeting of this kind can often be arranged in co-operation with neighboring industries, for workmen and families, or may be conducted at a picnic of the entire plant. Very recently an enterprising safety engineer arranged to show some moving pictures during the day at a picnic held outdoors.

A safety playlet is a good attraction, and the lesson in it is well remembered. There are quite a few plays that can be given by home talent without expensive or elaborate properties, so as to make them suitable for industrial organizations. These, if changed so as to provide some local color, are very effective.

In the larger centers of population, local councils have conducted safety schools. It is excellent training for the personnel of the plant to attend these schools, which should be encouraged wherever possible. The lessons taught in these schools can be used in organizing the same thing among the personnel of the plant. There are several instances where this has been done; the lessons have been given local color and local application and the results have been very good.

All of these activities should of course be followed by individual contact with the foremen and workmen by the safety department and members of the safety committee. Any good that can come out of a meeting of all employees or all of the employees of one department is lost unless the organization takes advantage of the personal contact. Workmen like to know that their attendance is appreciated and it is always advisable to give a man something to do in order to retain his interest.

Distribution of Letters, Prizes, Etc.

The occasional use of many unique things is a big asset in conducting safety work. They are, after all, advertising "stunts" that have been found profitable by commercial companies. The cost of using them is very often small, and the effect is universally very good.

Personal letters, from the manager to the foremen or workmen, urging more attention to safety and more skill in individual operations are a very good thing to use. Letters should preferably be signed in ink. The distribution of the payroll is an opportunity that the safety department should not overlook. Various companies have used pay checks with a safety message printed on it, a slip enclosed in the pay envelope or pay envolope with a safety message printed on the envelope itself. No one fails to read any of these; the pay envelope and contents are a source of interest to the workman and his family.

Sending the safety message into the employees homes will interest his family, and they will prevail upon him to be safe while at work. This is mentioned above in the use of the portion of the plant magazine for safety articles. But bulletins, postal cards with a safety message and possibly an illustration on them, and safety calendar for employees are excellent to distribute. In addition, rule books, buttons, blotters and the use of a safety slogan on the

bottom of all inter-department correspondence result in excellent reaction.

Prizes could be given to foremen or superintendents, or workmen, for good safety records, going a given time without an accident, for suggestions, or for contributing slogans. Prizes may consist of cash or bonus, jewelry, a working cap, lunch box with thermos bottle, a dinner to a group, a vacation or a trip to the Annual Congress of the National Safety Council. For competition between departments for a good safety record nothing has been found to be so good as the use of a banner or cup for display in working places. The workmen prize this more than anything else that is given them.

Pointers for the Engineer

By W. F. SCHAPHORST, M. E.

Which? Oil or Coal?

PAPER mill officials may find it less costly to burn oil under the boilers next winter than coal. Hence, now is the time to be seriously thinking about this very important question. Now is the time to decide—before the cold weather comes.

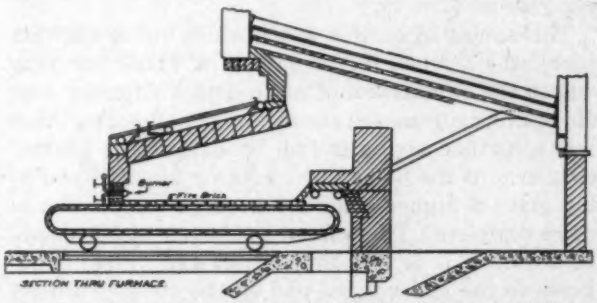
Oil in competition with coal is with us to stay. This applies to both high and low pressure boilers in paper mill power plants, most other industrial plants, and even under house heating boilers. It has in recent years been predicted numerous times by engineers that oil burning would not make any headway because of the increasing scarcity of oil. Today, however, although the demand for gasoline and oil is constantly on the increase, oil producers are having little if any difficulty in meeting the demand. In fact at the present writing producers are complaining because they have too much oil in stock and that there is not sufficient demand for it.

In order to produce ample and inexpensive gasoline, a number of new processes have been perfected to increase the percentage of gasoline from the crude state and decrease the percentage of residue. The result has been more gasoline, true enough, but at the same time despite the decreased percentage of residue there has resulted an abundance of residue. This residue is the fuel oil that we now find glutting the market, being sold and used in active competition with coal.

All who use coal will surely welcome a substitute that produces as much heat as or more than coal, and at a lower cost. All of us will welcome any substitute that will enable us to avoid the coal scarcity and the strike annoyances that spring up nearly every years.

At the moment that this is being written the newspapers are warning us that there is liable to be another severe shortage next winter, that one more strike is impending and that now is the time to purchase coal for the winter's supply despite the present high prices.

Just to show how some manufacturers feel about the coal situation (manufacturers not interested in oil burning equipment), I have a letter before me from a prominent manufacturer of power plant apparatus in which it is stated that the price of soft coal is likely to remain high for a long period of time. This, he says, is plain because the new arrangement recently signed is practically the same as the old agreement which expired only a few months ago. The writer is therefore convinced that as regards cheaper coal we can entertain but little hope and the paper mill executive who is now paying a high price for coal might well look into oil prices and the advantages that might be gained by changing over to oil, etc.



Showing how a furnace under a Heine boiler formerly fed by a chain grate stoker, was converted over to oil burning. Fire brick were placed on top of the chain grate as shown and the burner inserted just above. The cost of conversion is sometimes trivial and again it is sometimes so high that it is considered prohibitive

It seems to be quite the fashion to adopt oil burning these days. Yet, I would warn the paper mill executive not to be hasty. For instance, government engineers recently rejected oil burning in federal buildings in Washington, D. C. It seems that their principal argument, however, was: "We won't burn oil because we may need it in our next war. We will save the oil."

Naturally the first question that the purchaser always asks is: "Will it pay me in dollars and cents to change over to oil?"

In reply to that question I will give some actual data comparing the cost of burning fuel oil with the burning of coal.

In one of the principal manufacturing cities of New Jersey, at the time of compiling these figures, the price of coal per ton varied from $8.14 to $11.00 per 2,000 pounds. The price of fuel oil per gallon was 5¾c delivered. The oil had a heat value of 18,-

846 B.T.U. per pound. The heat value of the coal was figured to be 11,000 B. T. U. per pound.

It is easy to show on the basis of a specific gravity of .940 which the oil had, that one gallon of oil produced 148,000 B.T.U's. and that one ton gave 11,000× 2000=22,000,000 B.T.U's.

In burning coal there is usually about 2 per cent loss with the ashes which produces no heat. Knowing this it is then a simple matter to show that one ton of coal is equivalent to 145.5 gallons of oil.

Averaging the cost of coal ($8.14 plus $11.00 and dividing it by 2) gives us $9.57 per ton for the coal, while 145.5 gallons of oil at 5¾c makes the cost of oil $8.36.

Subtracting $8.36 from $9.57 gives $1.21 as the saving per ton of coal burned.

In this plant 300 tons of coal were burned annually amounting to a computed saving of $363.00.

The total cost of the oil burning installation was $1,560—the interest on which amounts to $93.60. Subtracting this from $363.00 gives the net saving per year as $269.40.

This saving in itself is worth while, but in addition there was a much larger saving of $1200 per year due to the elimination of an assistant engineer who did the firing, removed the ashes, etc. Besides, there was a further saving in fuel because of the greater efficiency of the boiler. Oil burning almost invariably gives a higher efficiency because combustion is more complete. There is no smoke and there should be no soot. It is well known that soot; when it adheres to the boiler tubes and on the shell, is a most effective insulator. Soot keeps the heat out.

For instance, the writer knows an installation in New York City where the over-all efficiency with coal burning was 63 per cent. On converting over to oil burning the efficiency became 79.6 per cent. This is due to the better combustion obtained with oil and to the cleaner boiler surfaces.

Don't Call It a "Tightener"

I RECENTLY read an article in a prominent technical journal on the subject "Gravity Tighteners as Applied to Belts" with which I disagree in spots. The subject of tighteners has always been a sore spot with me and it occurs to me that my viewpoint may be of some interest.

Personally I do not like the name "Tightener" as applied to a special pulley sometimes used with belt drives. I find that the name tightener is liable to give the belt user the impression that the principal thing is to run the belt "tight" and that tightness is of utmost importance. I would rather call the extra pulleys sometimes used for such purposes "Idlers," "Belt wrappers," or "Arc increasers"—anything but "Tighteners." It is possible to increase belt contact without increasing tension and that is how it should be done—with an "idler"—not with a "tightener."

Where pulleys are close together, as they often are on machines of various kinds, idlers of this kind are sometimes advantageous in increasing arcs of contact, but where pulleys are far enough apart to permit slack or easy running I would recommend that the idler be shelved every time if the drive is a horizontal drive. On vertical drives, to be sure, an idler pulley is often an essential.

The author of the above mentioned article was wrong in saying, "it (the idler) can be adjusted to give just the right amount of tension on the slack side at a point near the driving pulley." He should have said, "it can be adjusted to give the right amount of belt wrap or the right amount of belt contact on the slack side of the belt at a point near the smaller pulley." It is the small pulley, that slips, usually, because it has less belt contact in the ordinary open drive than the large pulley. Therefore, in order to give the smaller pulley enough belt contact the idler should always be placed close to the SMALL pulley regardless of whether it is the driving or the driven pulley.

On many machines short auxiliary drives are used in addition to the main belt drive. In such instances it may be perfectly proper to use an idler or arc increaser. But as for the longer overhead shaft drives or main belt drives, the same effect can be obtained more efficiently and more economically by operating with the right amount of belt slack. Slackness and belt ease are almost invariably possible under proper conditions—under proper belt management.

The Trend of Steam Pressures in Modern Plants

THE WRITER recently came across some very interesting figures on modern steam power plants and went to the trouble to make a comparison of central stations and industrial plants. There were twenty-three large central stations listed and fourteen large industrial plants.

I could not help noticing that the modern practice amongst central stations is to use much higher steam pressures than in industrial plants. Thus, the maximum pressure given for central stations was 550 pounds and the minimum 225 pounds per square inch whereas for industrial plants the maximum was 240 pounds and the minimum 125 pounds per square inch. Observe that the maximum for industrial plants is only 15 pounds greater than the minimum for central stations.

Adding all of the pressures together for the twenty-three central stations and striking an average, I find that the average pressure is 330 pounds per square inch, where for industrial plants the average is only 193 pounds per square inch or less than 60 per cent of the former.

The steam temperature for central stations, I notice, averages about 200 degrees higher than for industrial plants and economizers are almost in-

variably used in the central station, while in industrial plants they are rare.

In many of the new central stations evaporators are used for feed water treatment. Not one is mentioned in connection with industrial plants.

Of course, the central stations are much larger in capacity than the industrial plants. Besides, usage cannot be made of exhaust steam as readily in central stations as in industrial plants. In other words, in order to make a central station as economical as possible they are resorting to higher pressures and temperatures. In industrial plants this expedient is not so necessary.

Another thing worth noting: central stations almost invariably go outside of their own organization and employ special designing and consulting engineers to design the new plants. Industrial plants are prone to use the engineers on their own staff.

Written Instructions

ALL OF us will agree that the so-called "golden rule" is a very good rule to follow. I am a firm believer of it myself but probably do not always live up to it. An excellent way in which the engineer of the paper mill can assist himself and any possible successor is to put details regarding the plant in writing. Make sketches showing where buried piping may be found. Write about the peculiarities of certain valves and lines that have given trouble. Write out the best manner in which to operate the plant to obtain highest economy. In one instance an engineer did this very thing and it proved to be a revelation to himself. By writing things out he began to THINK more deeply into things, the whys and wherefores, and before he knew it he was making some very important improvements. His written matter came in handy for showing to the "boss." Written data, facts, figures, are always more impressive before an official than mere verbal statements. Besides, in case one should become ill and find it necessary to turn the plant over to an assistant temporarily, what is nicer than to have all important matters in writing? And lastly, in case you should leave your present plant and be given charge of a new one, wouldn't you like to have your predecessor hand you a bundle of written facts so that you would not have to pass through the same experiences yourself? If all engineers would do this, I dare say things would run much more smoothly and efficiencies would be considerably increased.

The Power System

Prime Movers

BY JOHN F. FERGUSON
Ferguson Engineers, Chicago

This article concludes the subject of "Prime Movers," which Mr. Ferguson has briefly covered in the two installments which began in the last issue. The author, who is widely known as an authority on power for pulp and paper mills, will continue to write other articles on the "Power System," which will appear from time to time in future numbers.

STEAM TURBINES

THE steam turbine, which was conceived before the steam engine made its appearance, failed to make much headway until the 20th Century, and has since developed at a remarkable rate, almost universally replacing the steam reciprocating engine in our central power stations of public utilities. It has also made considerable progress in the power development of the private plant of the industrial field, perhaps much further progress than has been warranted, with the result that steam turbines have been installed in many places not adapted to their service. These installations are due to a lack of knowledge on the part of the engineers and operators of their advantages and disadvantages, and the class of service that the different types and classes of turbines are most adapted to. Even many of the turbine manufacturers themselves seem to have little knowledge of their own equipment in this respect.

In the paper industry, the above statement referring to the misfit of the steam turbine is particularly noticeable. Such misfits are generally due to certain conditions in design of the plant that do not permit of their best performance, and in the improper selection of the type of turbine to best meet the present existing conditions, and not always due to some mechanical principle inherited in the steam turbine.

The steam rate of the different types or classes of steam turbines varies over a wide range, equal to or perhaps a wider range than the steam engines of different types or classes and sizes, but the steam rates of turbines, particularly non-condensing or back pressure types, seem to be very little understood or known of in general by the operators. In fact, the manufacturers themselves seem to have very little knowledge of them, if we judge by the estimated steam rates as supplied by some of them or their representatives. However, it is generally higher than supposed.

While it is possible to secure exceptionally low

steam rates in turbines, the cost of such units in the smaller sizes is comparatively high, so that the manufacturers have favored a unit of lower first cost with a chance of covering up the high steam rates in some way, rather than undertake the high priced machine with the better steam rates. In steam units of large sizes for public utilities, the competition between the steam turbine and engine does not exist at present.

Comparing the relative advantages and disadvantages of the impulse and reaction types of steam turbines, these may be outlined as follows: the impulse type possesses the advantage that it may be controlled or governed by the opening and closing of additional steam nozzles or groups of nozzles permitting the initial pressure to be influenced on all nozzles except the nozzle which the governor is acting directly upon, thereby taking advantage of the full expansion of the steam as far as possible. In the reaction turbine, the initial pressure is reduced generally by throttling, so that the turbine is actually working at reduced initial pressures depending upon the load on machine. This has a very pronounced effect on the steam rate of the machine, increasing much faster than with the nozzle control of the impulse type as the load is reduced. This is more pronounced as the working back pressure is increased, narrowing the range between the initial pressure and the exhaust pressure. Of course, all impulse steam turbines are not nozzle or nozzle group control; many types are throttle governed and do not possess the above advantages. Another advantage of the impulse type over the reaction type is that the blading is much less likely to become clogged up with scale, dirt or oil carried over in the steam, but this is a minor advantage, as no up-to-date plant would tolerate such steam conditions to exist to cause trouble in the system.

The steam rates of the two types at full load are practically parallel, except that it is considered by some turbine experts that the impulse type has the advantage in the earlier part of the expansion and the reaction in the latter part of the expansion. The governing effect no doubt partly accounts for the advantages in the early part of the expansion of the steam as referred to above.

As a strictly low pressure turbine, the reaction type seems to have the advantage in steam consumption rates, and the demand for the low pressure turbine is fast increasing where condensing units are required, for the reason that we have approached steam pressures and temperatures that cannot be successfully and efficiently handled in a single casing, and we are compelled to use both high pressure and low pressure units for complete expansion. This is particularly noticeable in large units of central stations of public utilities.

Practically all small steam turbines used for driving auxiliary units, such as: pumps, fans, field exciters, etc., are of the impulse type with single wheel and one or two or perhaps in some cases three rows of buckets and throttling governor, and represent the cheaper and most extravagant type of steam turbine, their steam rate being somewhat in excess of the throttling Governor engine.

The advantages of the steam turbine as a prime mover are: minimum space required both in floor area and in height; lighter weight permitting of smaller, lighter and cheaper foundations; minimum adjustment in machine permitting long and continuous service; no internal lubrication and elimination of oil in exhaust steam or condensate. The disadvantage is the higher steam rate which economically limits its adaptation to only certain classes of mills or conditions, its best field perhaps being the board mill (provided other items of design are taken care of in view of this type of prime mover), where the power demand in ratio to steam demand is comparatively low; and in some of the all steam-driven fine mills where it may be necessary to generate a small part of the power from steam through a condensing unit of some type.

Bleeder-Extraction Turbines

The present so-called Bleeder or Extraction type of steam turbine which is sometimes termed a cure-all machine, has been introduced into the paper industry, and represents one of the most extravagant types of prime movers that has ever been introduced into the power system of paper mills, not altogether because of any principles involved in the machine, but mainly because of the abuses of this machine and its principles which have made it so.

This unit was primarily designed to meet industrial conditions where it is desired to meet a combination of back pressure (particularly of an intermittent nature) and condensing machine permitting of the use of any amount of steam to be used at a predetermined pressure up to certain limits, and to maintain a uniform and balanced condition throughout any variation or interruptions in either power demand or steam bled from some section of the machine. While the principles involved are ideal, especially where conditions exist permitting of their economical use, the abuse in the use of this machine has earned for it the reputation of being the "Steam Hog" of the power plant, this is particularly true in the paper industry.

The great disadvantage of this machine is the high steam rate caused by incorrect design which permits of only a small amount of paper to be abstracted from the steam bled from the machine, necessitating a large amount of steam to pass to the condenser in order to generate the power demanded, and where over 75 per cent of the total heat of same in most cases becomes a total loss. This large heat loss to the condenser is too often overlooked and considered necessary, but in all classes of all steam driven paper mills (except the very highest grade rag stock papers

or as otherwise noted), there is absolutely no place for the so-called condenser, if proper engineering principles are involved in the selection of prime mover, power equipment and power system of the plant in general.

Manufacturers have given the low pressure or condensing end more attention than they have the high pressure end or bleeding section, where, in all cases in the paper industry it should be the reverse, as the amount of steam bled is large, while the amount of steam to the condenser should be small and in many cases would be nil if the high pressure section was of higher efficiency, this accounts for the extravagance of the unit. In many cases where bleeder or extraction type turbines have been installed, a straight non-condensing or back pressure type of turbine of a most economical class would have proved much more satisfactory and efficient besides reducing the investment to a considerable extent.

The economical field for the Bleeder or Extraction type of steam turbine is practically limited to high grade rag stock mills, operating finishing departments in connection with the paper mill, and combined pulp and paper mills, or in such installations where the power load is great compared with the steam demand, and in these cases, calls for a much higher class and more efficient type than has so far been marketed for paper mill use.

The trouble with the Bleeder type of turbine lies to a great extent in the manufacturers and users not knowing the characteristics demanded of a Bleeder type of turbine for different classes of industrial uses, and the manufacturers have attempted to manufacture a standard unit applicable to all uses (hence the name of "a cure all machine") with the results that it does not fit except in a very few cases and these only by a chance. The characteristics or requirements of a Bleeder turbine in the different industries or even in a single industry vary to such an extent that it is out of the question to build a turbine to cover all cases without going into something too expensive to become attractive. The special characteristics demanded in one case may be just the reverse of what is demanded in another case, so that the bleeder or extraction type of turbine must be considered a special machine in almost any case with a design for that particular case. The question then is to know the special characteristics demanded of any particular turbine installation. This calls for a much higher class of engineering service than has been given this subject in the past.

General

Fig. 2 shows in general the steam consumption rates of the different types of prime movers of the higher grade classes, based on a moderate steam pressure of 250 pound gauge, superheat around 140 degrees Fahr. and a working back pressure of 10 pound gauge pressure, in units of around 1,000 Kw. size. The curves A, B, and C may vary slightly from the above, depending somewhat upon the design and characteristics of that type of engine, and are somewhat lower than can be expected with steam turbines under these steam conditions.

Curve D represents approximately what can be expected from special types of steam turbines of improved design for higher efficiency under these working conditions.

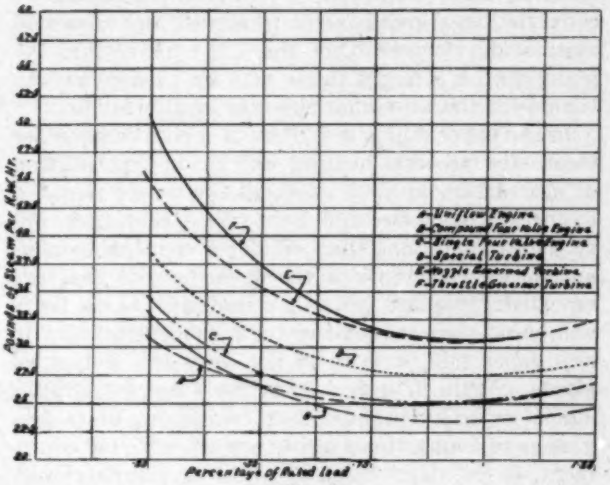


Fig. 2

Curves E and F represent steam rates of the very best class of steam turbines found in our paper mills, while the rates of the majority of the turbines installed will be very much in excess of these, giving you some idea of the performance obtained, and show the higher steam rate of the throttling governor over the automatic or nozzle controlled governor, particularly on part loads. This is due to the shorter range in expansion between initial or admission pressure and the exhaust pressure with the throttle governor reducing the admission pressure as the load demands, as referred to earlier in this article.

We have not attempted to show any curves of condensing units of any type, as cases in the paper industry demanding units of this nature are very rare.

In selecting a prime mover for an all steam-driven or partly steam-driven paper mill, it very seldom happens that the matter becomes a toss up as to what type of a prime mover is selected. The plant conditions will in nearly all cases be found to be more favorable to one type than the other, but it may become desirable to waive these advantages to some extent in order to meet other conditions, such as space, etc., particularly in old or present installations. However, in new plants if the whole matter is properly studied, there should be little trouble in having prime movers to fit the plant in every respect, and it is strange yet true to say that many of our newest and intended up-to-date plants have power plants of the most extravagant nature, due to lack of knowledge in the selection of prime movers for the

mill, or to arrange conditions in the mill to accommodate such prime movers.

In rebuilding power plants of industrial plants where new prime movers are considered, too often such prime movers are selected with only the existing steam and mill conditions (perhaps long out of date) in mind, instead of selecting units that can be converted to a great extent to almost any advanced state of development that may come up, so that the plant can be brought fairly well up to date at any time with the minimum changes or alterations.

In the paper mill where there is such a demand for steam for process, heating and drying, permitting of abstracting in most cases all the power required to operate the entire mill from such steam, there are very few conditions that call for a condensing unit, and as soon as some of the developments that are now under way are put on a commercial basis, there will be no place or demand for a condensing unit in any paper mill or even in but very few industrial plants. While it is true that there are many mills almost entirely operated from condensing units (engine or turbine), these plants are old, with old equipment, or in many cases are new or comparatively new mills with out of date equipment installed when new. The latter case being very common.

Resume

From the foregoing statements, together with a careful study of present tendencies, and looking into the future for increased efficiencies and greater economies in the industry, we can sum up the situation in regard to prime movers for the paper mill as follows:

For paper machine drives, where a variable speed is required and a steam drive is preferred, we can see the elimination of the Throttling Governor Twin Variable Speed steam engine and the extravagant types of steam turbines for this use, and the replacement of same with a higher class engine of the English or foreign type somewhat improved upon, or the adoption of a Compound Four Valve Poppet Engine with a new type of governing device especially designed to meet the requirements. The Sectionalized Electric Motor Drive will become a favorite over the engine drive and particularly in mills with two or more machines.

The Corliss type engine and other types of unbalanced Four Valve Engines will give way to the Four Valve engine of the Poppet type, and particularly designed for operation under higher pressures and higher temperatures with the minimum or no internal lubrication. Such engines will have higher speeds, reduced weight, lower first cost, and occupy less floor space per unit of capacity.

As to steam jacketing of engine cylinders, cylinder heads, etc., in order to improve the efficiency of the engine, there is very little to say. This has been undertaken to a more or less degree throughout the entire history of the steam engine, and we cannot look for any marked improvement in over-all efficiency by this method, with the use of superheated steam. With the use of saturated steam, the gain if any will depend upon certain conditions which space will not permit of going into in detail in this article.

The Unaflow engine will continue to survive or perhaps continue to come to the front for awhile as a single cylinder engine for light and varying load conditions, using moderate pressures and temperatures, as a low pressure engine of Compound and Multiple Expansion engines exhausting into a vacuum or extremely low back pressure. The latter, although a new field for this unit, will probably prove to be its greatest future eventually.

We can look for a fading out of the cheaper classes and extravagant types of steam turbines driving plant auxiliaries and generators, and a general trend to motor drive for such auxiliaries, and the adoption of a higher class and more economical turbines to generators where a steam turbine is favorable.

The Bleeder or Extraction turbine of the present extravagant type will give place to straight noncondensing or back pressure type turbines, steam engine and special types of Bleeder units to meet the conditions—the engine unit most likely the favorite. There is a field for a good Bleeder or Extraction type of turbine as referred to earlier in this article.

The Reciprocating steam engine will retain the supremacy by a considerable margin as a prime mover for the paper industry.

We can expect to see a new type of steam engine unit on the market before very long, this will differ considerably from the American practice, and will be a combination of foreign types. It will be remarkable for its efficiency, small size with large capacity, and occupy the minimum space per unit of rating and can be adapted to pressures and temperatures much beyond anything yet attempted. There is a great field to be reached by such a prime mover, and results gained will be amazing.

A Comment

In the August issue of this magazine there appeared on page 773 an article by Chauncey E. Cole, Superintendent of the Cincinnati Paper Board Company, called "High Test Container Board." In the eighth paragraph the author speaks of dirt being the one enemy which must be overcome in the beater room, and the last sentence of this paragraph reads "There are now several beating systems on the market which claim to take care of this."

We are prompted to state that there was only one system in the mind of the author, it being the complete cleaning system for box board stock manufactured by the Shartle Brothers Machine Company.

Hammermill Holds Twelfth Annual Conference

THE three days devoted to the Twelfth Annual Conference of agents of the Hammermill Paper Company, which was held August 22, 23, 24, 1923, at Erie, Pa., the home of the company, proved to be of great benefit in that ideas were exchanged (both new and old) and sincerity and good fellowship was promoted between all those associated with the Hammermill Company.

The conference was informally opened by members of the agents advisory committee with a meeting at the home of Ernst R. Behrend, president of the Hammermill Paper Co., on Tuesday, August 21. After the business conference the agents were entertained at dinner at the Erie Club.

Wednesday morning, August 22, the scheduled opening of the conference was given over to the registration of the visitors at the Lawrence Hotel in Erie, and a reception at the Kahkwa Club where the business sessions of the convention were held. Immediately after luncheon the first general assembly for the business meetings was called with E. R. Behrend presiding as chairman. Mr. Behrend made an address of welcome and spoke of the value and possible good of the conference.

"This convention, gentlemen, is coincident with our twenty-fifth business anniversary; and it seems like yesterday that on the 28th of June, 1898, we broke ground," said Mr. Behrend. "It is at all times proper, and particularly at anniversaries, to look back upon the past; and since we are ahead of time, and since this conference follows our twenty-fifth anniversary so closely, will you give me permission to just refer a little bit to the years gone by?

"A very famous historian," continued Mr. Behrend, "I think Professor Munson, has said 'Not to look back upon the lessons of history in attempting to solve the problems of the present and immediate future, is like being cast rudderless upon the sea of life.' To just glance back a little, may be profitable to us all, and, especially for those who may be here for the first time.

"Hammermill has endeavored during the last twenty-five years to build up an institution, using the word in its broadest sense, which does not consist only of brick, railroad tracks, iron, and machinery, but which stands for something bigger than just that, and for something broader than just a money making institution. We have tried to make men rather than making money or paper, and to perpetuate our own organization in its human phase by carefully selecting our employees at the bottom, eliminating them there if necessary, fitting them for their work as well as we could, giving them opportunities according to their ability and their effort, and compensating them whenever possible in accordance with the contribution that they made to the company. We have tried to build up a concern which should not be a man governed concern, but a company governed by policies and principles; and we have tried to re-inforce and strengthen these principles and policies to such an extent that, admitting that they are not perfect today, agreeing that our curve of progress is by no means an unbroken one, but due to the weaknesses and imperfections of human nature, shows a number of zigzag

Group picture taken of the Twelfth Annual Conference of Hammermill Agents, August 22, 23 and 24, 1923

parts—assuming and admitting all that, we believe we have perfected such an organization which today cannot be overthrown in its policies by one or two or a handful of men, even though they be in high positions."

N. W. Wilson, vice-president of Hammermill, explained the purpose of the conference as being designed to "Study the manufacture and merchandising of paper over the long pull." Mr. Wilson pointed out the fallacy of making plans to cover some short interval or special occasion and stressed the importance of adopting principles and policies that were fundamental and could be relied upon to guide a business successfully over any period of time with only minor adjustments to meet some special contingency.

W. S. Epply, promoter of sales, explained by means of a series of charts the progress that Hammermill products have made during the past year.

New Advertising Plans

A direct by mail advertising plan that met with the instant approval of everyone present was explained by C. W. Chabot, the Hammermill's advertising manager. Everyone present agreed that the idea was sure to be a winner. The plan provides for furnishing the printer with a complete portfolio to be used in presenting his proposition to the printing buyer. The agent in turn is supplied with a broadside, also having samples attached, that will better enable him to place the material before the printer. Along with the broadside go a number of fine samples of the printing art which the printer in turn gives to his prospective customers. This continuous line of contact between the mill and the consumer will do much to break down the natural barrier of resistance and make the road easier for the sales representative. Mr. Chabot was warmly congratulated upon the plan he has evolved.

There was a very beautifully arranged display of Hammermill Social Stationery at the conference, and G. R. Burkhardt of the White and Wyckoff Mfg. Co., converters of this stationery, spoke on the progress that this line is making in establishing itself among the leaders.

Thursday morning was occupied with the agent's private meeting. After the luncheon that followed this meeting, everyone attending the conference assembled for a group photograph.

E. R. Behrend, in opening the business meeting in the afternoon, expressed his appreciation of the work the agents' advisory committee is doing. Unfinished business of preceding meetings was then reopened for discussion.

Presentation of Clock

During the discussion, W. F. McQuillen, chairman of the agents' advisory committee, pre-empted Mr. Behrend's chair with the assertion that he was about to conduct the meeting in accordance with his own ideas. He then called upon Frank Floyd, of the Crescent Paper Company, Indianapolis, for any remarks that he might have to make.

Mr. Floyd, in behalf of the agents attending the twelfth annual conference, presented to E. R. Behrend and Dr. Otto F. Behrend and their associates at Hammermill, a massive clock, beautiful in design and workmanship, in commemoration of Hammermill's twenty-fifth anniversary. The clock has the unique feature of being able to reproduce both the Trinity and Westminster chimes and is a marvel of the craftsman's art.

Annual Dinner

The big annual dinner was served at the Kahkwa Club Thursday evening. An excellent orchestra furnished the music for the feast, and everyone was delighted with the singing of "Mr. Gallagher and Mr. Sheehan" by Postmaster Hanley and Superintendent of Schools Diehl of Erie. E. R. Behrend surprised the agents and his associates by announcing that he was going to depart from his usual custom and would not make a speech. In previous years Mr. Behrend has always given an address that was very well received. His departure from this custom was a disappointment to many of those in attendance. Mr. Behrend then called upon Mayor Kitts of Erie for an address.

Mayor Kitts paid a tribute to Hammermill for its policy of honesty and fair dealing that has contributed much to the community of which it is a part. He welcomed the visitors and assured them that Erie would do its best to make their stay a pleasant remembrance to be carried back to their own communities.

W. F. McQuillen of Boston, in his speech on "The Benefits of Association Work as expressed by Hammermill Conferences," made an earnest plea for a concentrated effort in furthering a plan that has been adopted and proved satisfactory. He traced the convention idea in the trade paper from the beginning of the National Paper Trade Association in 1903 up to the present time. The success that Hammermill has attained and the success attending the majority of those who sell the Hammermill products was used as an illustration of the benefit to be derived from following the plans made and agreed upon at these meetings. He urged a more intensified effort to increase that success.

John Leslie of Minneapolis, in his speech "The Future of the Paper Merchant and his Opportunity with the Hammermill Lines," pointed out the inevitable success that must come to anyone who handles a consistently superior product that can be depended upon for its uniformity in quality.

Friday, the closing day of the Conference, was devoted to athletic sports at the Kahkwa Club. The baseball game, between the East and the West, was won by the East at a score of 10 to 5, which was a decided difference to the previous score of these two teams, in which the West won by a score of 32 to 2. Besides baseball, there were several games of golf, tennis, quoits and trap shooting.

The following agents, by attending the twelfth annual conference, became members of the Old Guard:

W. T. Sibley, Alling & Cory Co., Buffalo.
A. H. Seylor, Alling & Cory Co., Pittsburgh.
F. F. Fox, Crescent Paper Co., Indianapolis.
G. J. Kuebel, Durico Paper Co., Erie.
Geo. McKinney, F. A. Flinn, Inc., New York City.
G. W. Hoffman, Holland Paper Co., Buffalo.
Fred Stutzman, Holland Paper Co., Buffalo.
E. J. Cooper, Hudson Valley Paper Co., Albany.
John Leslie, John Leslie Paper Co., Minneapolis, Minn.
E. C. Mead, Richmond Paper Co., Richmond, Va.
James McCracken, Riegel & Co., Philadelphia, Pa.
W. C. McQuillen, A. Storrs & Bement Co., Boston, Mass.
W. B. Stevenson, A. Storrs & Bement Co., Boston, Mass.
P. A. Stuhhlreyer, Diem & Wing Paper Co., Cincinnati, O.

A souvenir, in the shape of a sterling silver ash tray, was presented to everyone present, by the Hammermill Company, in commemoration of their Silver Anniversary. Each guest was also presented with a small, attractively bound copy of Emerson's essay on Compensation, by Mr. Norman T. A. Munder, president of the Norman T. A. Munder & Co., of Baltimore, Md.

The Simonds Economic Prize

Early this year, Alvan T. Simonds, president of the Simonds Saw and Steel Company of Fitchburg, Mass., offered prizes of $1,000 and $500 for the best two essays on the subject, "The Lack of Economic Intelligence." The contest was open to students in the high schools, trade schools, and normal schools throughout the United States and Canada. Last year Mr. Simonds gave a similar award.

These prizes were offered in a sincere effort to stimulate an interest in the study of Economics on the part of those who will lead the thinking of the coming generation.

The first prize of $1,000 was won by John J. Borchardt of Brooklyn, N. Y., and the second prize of $500 by Morris Saltzman of Brooklyn, N. Y. The winner of the first prize is 18 years of age and the winner of the second is 17 years old. They both graduated from the Commercial High School of Brooklyn, N. Y. last June. Both young men are of foreign extraction, Borchardt being of German and Saltzman of Russian descent.

In adidtion to the two cash prizes the judges, Leon C. Marshall, University of Chicago, and John G. Thompson, Fitchburg, Mass., have awarded honorable mention to three as follows:

Milton Landau, High School of Commerce, New York City; David Sbritsky, Wilmington, Del.; Martin Daniel Imhoff, State Normal School, Oshkosh, Wis.

In the preceding contest, the winner of the first prize was from the High School of Commerce, New York City, and the three leaders in the present contest are from Greater New York. The first city in America in population and in business has been wise enough to realize the danger, in a democracy particularly, from the lack of economic intelligence on the part of its citizens and has made economics a required study in all its High Schools. When will other cities see the light and when will the American public demand that all teachers in the Junior and Senior High Schools at least possess economic intelligence?

Of the five leaders in this contest how many seem from their names to be of what is usually considered American stock and how many from families not long in this country? The prize winners in the preceding contest were of Russian and German descent and were both boys. Where are our old stock American boys? And where are the girls?

How the Richardson Company Solved Their Water Problem

By E. A. WEISSBACH, Plant Engineer

IT TAKES on the average about 99 lbs. of water plus one lb. of paper stock to equal 100 lbs. of paper. In other words, water enters into our manufacturing equation to the amount of 99 per cent. This does not mean merely that an adequate supply of clean, pure water is desirable, but it brings out the fact that it is a prime necessity—water must be available at all times or our output is decidedly decreased.

Before going into the details of our water system, a few words regarding the growth of our company would not be out of place. The Lockland plant founded June 1st, 1868, at its present location, was expanded until its twenty-four-hour output has been increased from 1,000 lbs. to 225 tons of paper board daily; from a few to 1,200 employes; from one to 59 products; from a small capital to $7,000,000.00 capitalization; and from one small building to several buildings covering 16 acres on a site of 75 acres.

The Lockland Plant manufactures box board, fibre shipping cases, printed folded cartons, asphalt shingles, roofing felt, roll roofing, and Viskalt. Our slate quarry at Fairmount, Ga., supplies slate granules for the Flex-a-tile shingles which are manufactured here and at our other plants—Melrose Park, Ill., and New Orleans, La. The annual capacities of these plants are over 150,000 tons of paper products, 400,000,000 shingles and 300,000 tons of slate. From these facts, the reader will have a proportionate idea of our daily water consumption (7,000,000 gallons) and the size of the plant. In one year at Lockland alone, we used enough water to fill a canal 15 feet wide, 4 feet deep extending from Chicago to New York City.

When the site for this mill was selected on the Miami and Erie Canal, the founders had two essential points in mind: first, an adequate supply of water, and second, cheap transportation. The Miami and Erie Canal, before it fell into disuse, connected the Ohio River and Lake Erie, and for many years our entire water supply was procured from this canal. As we progressed, however, our demand for water increased so rapidly that we were soon confronted with the fact that this source was insufficient, especially in the summer. After various geological examinations were made, it was decided to add to our supply by drilling wells on our property and using the underground water. We realized that if the well water could be obtained in sufficient quantities it would be most desirable as the quality could not be improved upon.

The source of underground water is the rain and melting snow. A certain amount of this is evaporated, or drained into rivers or lakes; but the remainder percolates through the soil and continues to seek lower levels, due to gravity, until an impervious stratum is encountered. This stratum, usually of rock, is topped with a sandy formation which acts as a conducting path to the water. The water remains in this natural reservoir in abundant quantities and by drilling a hole through this formation and placing a separating screen in the hole, the water enters the well—the sand being held back by the screen. The water then may be obtained from the well by either pumps or compressed air. We are using both.

Installing First Wells

Our experience at that time with well construction and underground water production was very limited; in fact, we were guided by those in our locality who were using wells and the results they were having. Six inch wells were drilled 160 feet in depth. Inside each well and adjacent to the water bearing formation was 70 feet of brass strainer which served to separate the water from the sand. The water entered the circular strainer through horizontal slits which were just wide enough to allow free access to the water but which held back the grains of sand. The area through which the water entered was the circumferential area of the screen openings which was $3.14 \times 6 \times 70 \times .25$ or 27½ square feet. This assumes that 25 per cent of the screen consisted of openings.

Our water demands continually increased, and as a result a new well was drilled and more pumping equipment purchased every few years. By 1920 we had seven wells, four of which were distributed around the concrete reservoir. The reservoir was the termination of all service water lines: the pipe line from the mill creek; the old tail race from the canal; the overflow from the drinking system; and the supply from all wells.

The water from four of our wells was pumped by deep well plunger pumps, driven by electric motors or steam, and the

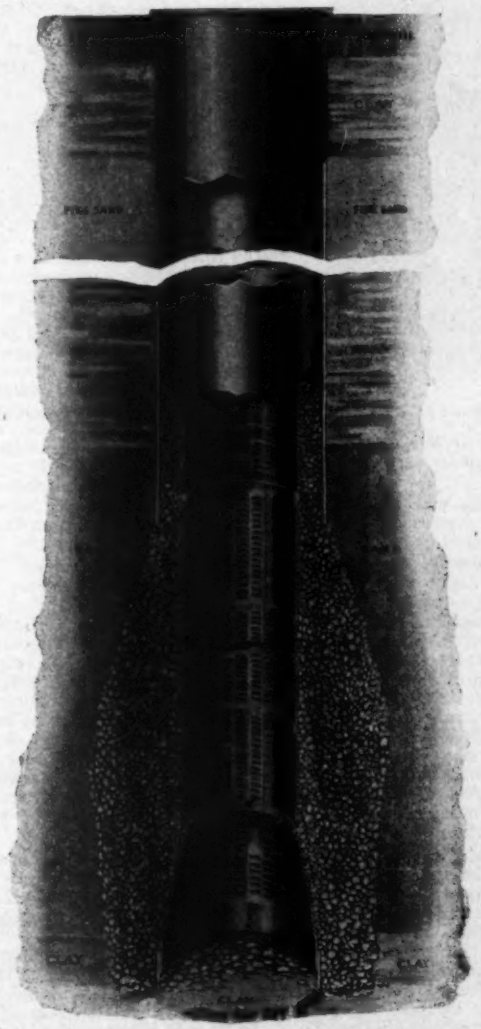


Fig. 1—Sectional view of gravel wall well

remaining three were pumped by air supplied by a central air compressor. Each well produced between 300 and 350 gallons per minute, so that our daily production from all sources was approximately 5,000,000 gallons. In addition to our manufacturing requirements for water, the drinking fountains, the boilers, and miscellaneous uses had to be supplied so that the water demands were just equal to the supply. If the canal from which we were getting large quantities of water had gone dry we would have been, in the vernacular of the street, "Out of luck."

In 1920, this was the water situation at The Richardson

Company, and although temporarily satisfactory we knew that within a few years we would need considerably more than we had available, especially since the canal was gradually decreasing as a valued source of water supply. Our late General Superintendent, Mr. Mullin, while on a trip to our New Orleans mill, visited several water supply installations and discovered that in some plants, quantities of 1,500 and 2,000 gallons per minute were being obtained from one well. To him, this was a revelation in well water production, as our present wells had never produced more than 400 gallons per minute. Immediately upon his return he advocated that we investigate the water problem again. The situation had grown so serious that it was either a question of getting more water or discontinuing the normal expansion of the mill; this of course would have proven most disastrous to our rapidly growing business.

Fig. 2—Sectional view of shutter screen

The installations which Mr. Mullin had investigated at New Orleans were put in by Layne & Bowler Company, Memphis, Tennessee. They had a unique method of well construction which enabled them to procure underground water in exceedingly large quantities. We consulted this company and as a result one of their engineers was sent to Lockland to make the necessary investigation of our property. We had been drilling wells and experimenting with various pumps and air lift, and thought that we could qualify as experts in the knowledge of wells and of the various methods of obtaining water from wells. When the Layne & Bowler company made claims of being able to produce 2,000 gallons per minute from one well, it seemed inconsistent compared with the production of our former wells. We were skeptical but very anxious to have them prove their assertion. The contract for two large wells was given to them.

How New Wells Were Made

In September, 1920, the well drilling crew started the work, and their procedure was so different from any well work we had experienced that a brief description will be of interest. Instead of drilling a 6 inch hole, a 40 inch hole was drilled to a depth of 170 feet down to rock; a 40 inch steel casing was placed in the hole and extended from the surface to the beginning of the water bearing formation. Inside of this 40 inch casing and extending from the ground level to the rock, was one continuous 24 inch steel caisson, or cylinder, consisting of 90 feet of solid casing and 80 feet of shutter screen, the latter being set adjacent to the sand from which the water was obtained.

From Fig. 1 it will be noted that there is an intervening space between the inner cylinder and the outer casing; into this space was fed a predetermined size of gravel. It was necessary that the gravel wall have a smaller percentage of voids than the sand in order to keep back the sand, but yet admit the water freely. Due to the fact that the gravel served as a separating screen, the size of the openings in the steel shutter screen were much larger than if the sand were directly against the screen. From the construction of the shutter screen (Figure 2), it can be seen that any sand carried in suspension by the water passing through the gravel had to make a right angle turn in order to enter the well, and by virtue of the inertia of the sand, it was usually deposited on the outside. In any event the sand did not clog the screen, because if it were not filtered out by the gravel or the shutter screen, the openings were large enough to allow it to enter the well and it was pumped out with the water.

As soon as this intervening space had been filled with gravel, a test pump was lowered into the well and the water sucked through the gravel and screen with a high velocity. The water rushing through the well carried with it large quantities of sand; as the sand was pumped out, gravel was fed in from the top so that the sand for several inches from the screen was replaced by gravel until a gravel wall of about 12 inches entirely surrounded the screen. Of course the sand and water pumped out at this time were discharged as waste, since that was an essential part of the well construction.

The next step was to remove the test pump and put in the permanent pump which drew the water into the well at a much lower velocity and thus allowed the water to drop any suspended sand when passing through the gravel filter. The cylindrical surface of separation between the water and the sand was not the screen but the gravel, so that the true diameter of this well was about 45 inches. As a comparison in reception area, it was interesting to note that the water entrance area of this system was $\frac{3.14 \times 45 \times 80 \times .50}{12}$ or 473 square feet as compared with 27.5 square feet of the former screen (50 per cent openings in the shutter screen). Since an area 16 to 17 times as large is presented to the water, naturally the velocity of the water was much lower, which meant a more serviceable and efficient well.

Capacity of New Wells

In June, 1921, the two wells were completed and the official test showed that from our two wells we could secure 7,000,000 gallons per day. Figure 3 shows well No. 1 being tested. One of the new pumps was arranged to discharge into the old tail race, so that we could pump directly into the course of the former supply; the other well was constructed near the reservoir so that the piping and construction work would be a minimum. An external view of one of the pump houses is shown in Figure 4.

Each pump was driven by a direct connected 100 H.P., 1,150 R.P.M., 230 volt compound wound direct current motor of the vertical type. The pump proper, which was 100 feet below the surface, was connected to the pump head and motor by the vertical discharge column and vertical shaft. These pumps are merely centrifugal pumps in a vertical position. The operation is practically noiseless except for the humming of the motors. The cost of pumping by this method is very economical compared to other methods of pumping or to the price of city water. We recently tested one of the new wells and found that the pump and well were delivering 2,700 gallons per minute or 162,000 gallons per hour; the motor used approximately 75 kilowatt hours in one hour. At a cost of 1½ cents per Kw hours, it means that for 162,000 gallons of

Fig. 4—External view of pump house

Fig. 3—Preliminary test well No. 1—2750 gallons per minute

water the power cost is $1.08 or about ¾ cent per 1,000 gallons.

The drawing in Figure 5 shows the layout of our present water system. The 1,750,000 gallon concrete reservoir located in the approximate center of our water distribution system serves as an equalizer between our supply and demand. If the demand for a short time exceeds the supply, the reservoir makes up the difference; when the supply exceeds the demand, the reservoir stores the water until needed. The pressure on our mains is provided by a pressure tank 18 feet in diameter x 40 feet high.

All the water with the exception of the drinking water is first pumped into the reservoir, and from there it is pumped to the beater rooms, mixing vats and showers, the boilers and other points of consumption. The first outlet is to the engine room where it is used for condensing purposes; after passing through the condensors, it passes back into the pressure tank. The overflow of the pressure tank is connected to the 12" pipe line leading from the Layne well to the reservoir so that any overflow is transmitted back to the reservoir. The second path is from the tank to the felt mill and board mill, beaters, vats and showers. The third path is the boiler water which passes through the water softeners and thence to the boilers. Our drinking water system is of course entirely separate from the service water, except that the overflow or excess water passes into the reservoir.

Our demand for water has increased to such an extent that we have been running one Layne pump 24 hours a day for a year and one half and pumping about 3,800,000 gallons per day while the other pump is theoretically held in reserve. At the present time, we believe our water problem has been completely solved, as our water system is admirably adapted to our plant, our supply more than we can use and it should serve us for many years to come.

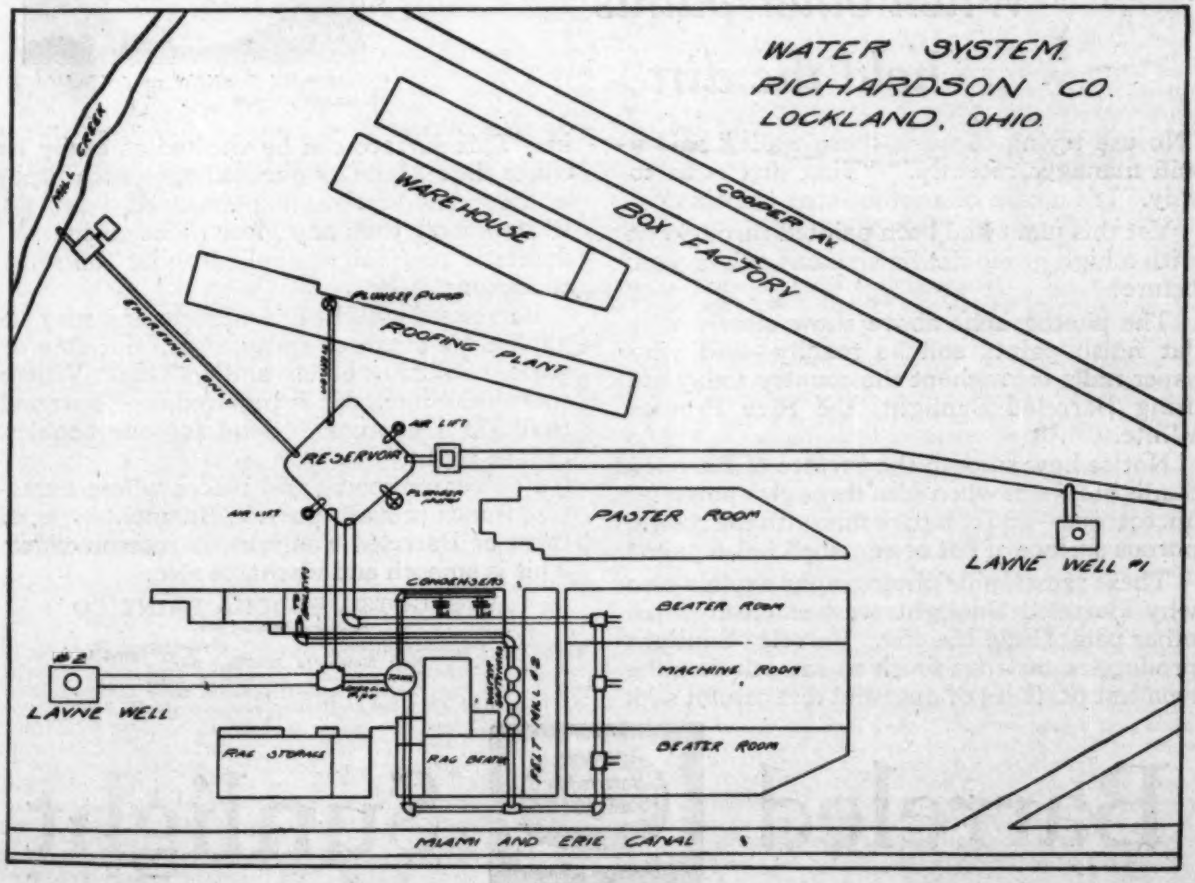
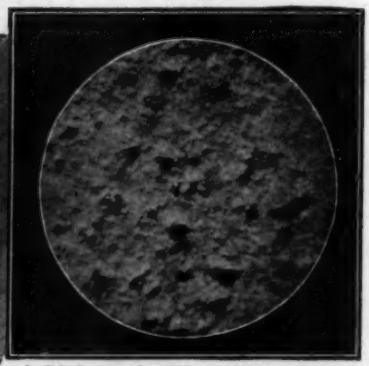
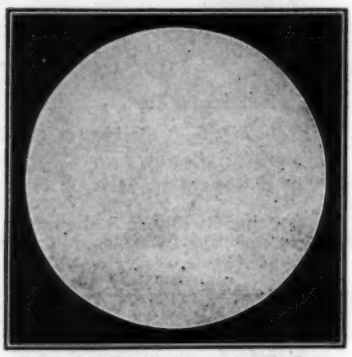


Fig. 5



A high-grade flat or "egg-shell" finish paint photographed through a microscope



Barreled Sunlight magnified to same degree

Why it washes clean

When other paints hold the dirt

"No use trying to wash these walls," said a mill manager recently. "That dirt is in to *stay*. It's a case of another coat of paint."

Yet this plant had been painted throughout with a high grade flat finish paint only a year before!

The photographs above show clearly why flat finish paints soil so readily—and why paper mills throughout the country today are using Barreled Sunlight, the Rice Process White.

Notice how smooth the surface of Barreled Sunlight is even when seen through a powerful microscope—and compare this with the rough, porous surface of flat or egg-shell finish paint!

These remarkable photographs explain also why Barreled Sunlight washes clean when other paints hold the dirt. Barreled Sunlight produces a lustrous finish so smooth that the smallest particles of dust and dirt cannot sink in. This surface can be washed as easily as white tile. Made by our exclusive Rice Process Barreled Sunlight is guaranteed to remain white longer than any gloss paint or enamel, domestic or foreign, applied under the same conditions.

Barreled Sunlight flows freely and may be applied by brush or spray. Will not chip or scale. Sold in barrels and in cans. Where more than one coat is required, use Barreled Sunlight Undercoat. Send for our booklet, "More Light."

For beater rooms and places where excessive fumes prevail, Chemic Enamel, a special form of Barreled Sunlight, is recommended. This is smooth and washable also.

U. S. GUTTA PERCHA PAINT CO.

Factory and Main Offices

31 Dudley Street Providence, R. I.

New York—350 Madison Ave.
Chicago——659 Washington Blvd.
San Francisco—38 O'Farrell Street

And 100 other distributing points in the U. S. A.

Barreled Sunlight

THE RICE PROCESS WHITE

High Speed Paper Machine Installation at Washington Pulp and Paper Corp.

Another high speed paper machine was started up early in January of this year on newsprint production. This one, a 164-inch machine built by the Bagley & Sewall Company and equipped with Westinghouse Sectional Drive, is located on the Pacific coast in the plant of the Washington Pulp & Paper Corporation, a modern mill 100 per cent electric driven, designed and built by V. D. Simons, consulting engineer, of Chicago.

Located in a large, well-lighted and well-ventilated machine room across the aisle from a slower speed and older machine of the same size and make, this new machine, equipped with powerful motors and designed for flexibility and precision of control, gives promise of great things in the modern history of paper making.

In this installation the observer will see many new features, the results of the experience and ingenuity of the paper machine builder, the electrical manufacturer, the consulting engineer and the executives and operating management of the paper company, the worth of which have already been demonstrated by the exceptional performance of the equipment in the short time it has been in operation.

Some of the features that stand out or are of special interest in this new paper-making unit are, beginning at the wet end: the Bird screens, driven through a group of enclosed gear units by squirrel cage motor and the adjustable slice, rectifier, and motor operated adjustable Fourdrinier. The closely coupled presses with vertical felt stretchers in the basement, operated by squirrel cage motors with push-button reversing control and automatic cutout at limits of travel, attract attention, as do also the Simons ejector system for removing the condensation from the dryers, the Pope air and Sheahan system for handling the sheet, and the wide hood with 12 large stacks for natural ventilation. The driving units for the several sections of the machine have totally enclosed direct current motors at the wet end, open motors for the other sections, and totally enclosed self-contained reduction gear units throughout. They are equipped with floating shaft type of mechanical connections for couch, press, calender and reel sections, and self-aligning pedestal ball bearings and flexible couplings for the dryer sections. The floating shafts with flexible couplings are provided to take care of any misalignment that may develop between the driving shaft. Convenient push buttons for starting, stopping or inching any section and a master push button station for raising or lowering the speed of the whole machine are provided, and there is also a small hand wheel for each section speed changed for adjusting the draw of that section.

Machine room at Washington Pulp and Paper Corporation, showing at the left, the 164-inch paper machine

The control equipment and the motor generator for supplying direct current for the section motors are located in the basement out of the way, since they need not be visited by the machine tenders in connection with the operation of the paper machine.

The winder is driven by an adjustable speed direct current motor, and the control is novel in that only one operating handle is used in starting, inching, increasing to any speed and for obtaining dynamic braking when a quick stop is desired.

While no attempts at record speeds have been made so far, the equipment has made a good showing, and since the electric drive and control is designed for a paper speed of more than 1,200 feet per minute and the other essential features of this paper production unit were designed for high speed, interesting developments are expected.

Section driving units

Public Hearing on Casein Tariff

Coated paper manufacturers were granted a public hearing before the Tariff Commission August 13 and 14 on a reduction in the import duty on casein under the terms of the flexibility tariff

Mr. Martin Cantine, of Saugerties, N. Y., was the representative of the paper men. He asserted that the duty of 2½c a pound imposed by the 1922 tariff act had increased the cost of casein by the full amount of the duty or more on the imported product.

His chief argument was "that it had been impossible for the paper manufacturers to pass on this increased price to their consumers and that as they were financially unable to absorb the duty in full the consequence had been a decrease in consumption of their paper, publications turning to cheaper grades of paper, until mills now are operating at only about 60 per cent of capacity." He stated that imported casein is of a more uniform quality and cleaner generally than the domestic product and hence always has commanded a differential of about 1c a pound above the price of domestic casein.

Casein prices, according to figures introduced at the hearing, have fluctuated widely in the past year. The price of imported casein, which has averaged around 9 and 10c a pound in previous years rose to as high as 36c a pound in 1922, when heavy demands were felt. Imported casein is preferred to the domestic product on account of its better quality.

The National Milk Producer's Federation were the defenders of the tariff. The essence of their arguments were: that it required 100 pounds of milk to make 3 pounds of casein; that due to the heavy volume of imports the casein industry has not been able to gain a sound foothold in the U. S.; that the costs of producing milk had increased considerably during the past year. They contended that under the protective tariff, the domestic industry could be placed on a stable basis, both as to quality and quantity.

It was stated that the maximum requirements of casein in this country was 44 million pounds, while the maximum production was 12 million pounds. The maximum imports in this country were 17 million pounds, in 1919. September 25 was the date set for the final argument of the case.

"When the New Man Took Charge of the Board Mill"

"He proved to us that he could produce a better board at a lower cost. We were skeptical at first but the results proved him right on every count.

"In the first place he eliminated foreign matter in the main breaker beater. He enabled us to use centrifugal instead of plunger type pumps for handling the stock in the chests, which meant a big saving in power and space. He made possible an actual refinement of stock in the beaters, relieving the load on the jordans and he reduced the wear and tear on the agitator equipment and saved cleaning time. In whole he gave greater production, saved in the amount of equipment required, in power, help and floor space and made a better board. He did it by installing a Murphy Continuous Beating System."

Full information regarding breaker beaters with a continuous attachment for Murphy Continuous Beating systems may be obtained by addressing a letter or card to

Valley Iron Works Company

Plant: Appleton, Wis.

New York Office: 350 Madison Ave.

Builders of: Niagara Beaters, Valley Iron Works Holland Type Beaters, Washing Engines, Bleaching Engines, Stuff Pumps, Centrifugal Pumps, P.A. P.A. Rotary Screens for Pulp and Paper, Complete line of wood-room equipment.

Builders of heavy duty beating engines and agitator equipment, stuff and centrifugal pumps, Murphy Stock regulators and shower pipes especially designed for board mill use.

He Proved to Us that he could Produce A Better Board at a Lower Cost

The Modern Paper Plater Drive

A. F. PAIGE, *Sales Engineer*
Westinghouse Electric and Manufacturing Co.

PAPER platers are used to produce linen or other special surfacings to sheet papers. The sheets are stacked in a book between sheets of zinc, linen, cardboard, etc., depending upon the surface desired. The complete book is placed between thin metal covers. The finish is applied to the paper by the pressure of the rolls when passing the book back and forth between them. This is usually effected by reserving the direction of rotation of the plater rolls.

The modern paper mill uses individual electric drives liberally and obtains thereby greater production per machine at less labor, power and space cost. The individual electric motor drive eliminates expensive belting, countershafts with their disagreeable oily bearings, etc., and permits more effective lighting, thereby improving health and morale of operators and reducing wastage.

The more common types of plater drives are the belt drive and the individual motor drive. Both of these drives are usually reversing. The motor used with the belt driven plater requires no special consideration. The constant reversals, however, are unusually severe on the belts, causing them to be short lived. Further, the belt slippage upon reversal is considerable and involves the absorption of quite a bit of energy and the loss of time. One example of the belt driven plater is shown in figure No. 1.

To eliminate belts, countershafts, oil bearings, etc., of the belt driven plater, there was devised the individually motor driven plater as shown in figure No. 2. This drive is simple, rugged and compact. The phase wound reversing motor has high torque characteristics. It is mounted on a bedplate common to the plater and coupled to the plater pinion shaft. The external rotor resistance assists in keeping the motor cooled by dissipating outside of the motor much of the heat of the reversal. The control consists of three units, viz., a three position master switch, a cabinet enclosed contactor panel, and an oil circuit breaker primary switch. The small drum controller, or master switch, with one forward, one reverse and one off position, is mounted on the end of the plater table with a short piece of flexible conduit attached to allow the table to be raised or lowered. The length of travel of the switch handle is very short, and, therefore, does not tire the operator's wrist. This master switch controls the two magnetically operated contractors of the contactor panel. The contactors are mechanically interlocked, one furnishing power to drive the plater forward, the other to drive the plater in the reverse direction. Consequently, the control is extremely simple.

The oil circuit breaker is used to disconnect the control circuit from the power source and functions to protect the equipment from extreme overloads.

As the duty of the reversing plater drive is rather heavy, the equipment is made rugged to withstand this type of service. Ordinarily, the plater will be reversed from 10 to 20 times a minute, but when starting to plate a thick book that is full of air, the reversals may reach a frequency of 30 to the minute.

Fig. 2

The paper mill in which the Norwood Engineering Company equipment of figure No. 2 is installed, increased its production on this plater by 20 per cent, after the replacement of the belt drive by the reversing motor drive. The shorter time of reversal and the increased speed of the rolls made possible by direct motor drive permitted this increased production. This 36" plater, having 17" diameter rolls and operated at 20 r. p. m., plates 72 books of very high grade bond in 2½ hours at an energy expenditure of 10.8 KW hours. The books consisted of 125 sheets each, 28" by 34", of 41-lb. paper.

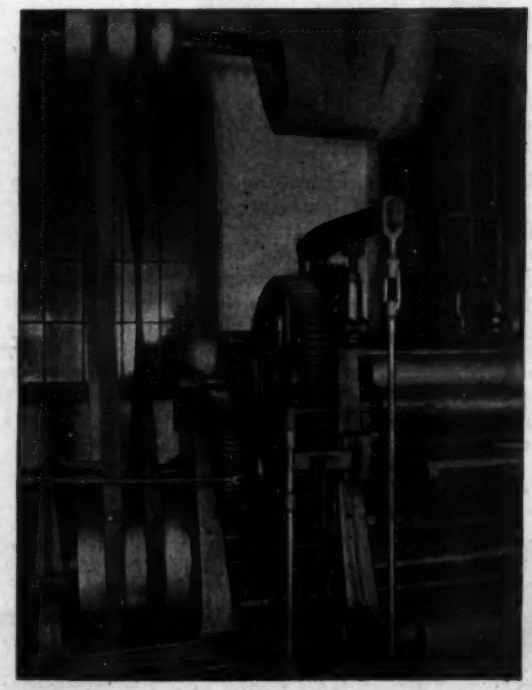


Fig. 1

Takes Over Canadian Plant

The Charles Walmsley & Co. (Canada) Ltd., manufacturers of paper and pulp machinery, have recently taken over the plant of Armstrong Whitworth (Canada) Ltd., located at Longeuil, on the south side of the St. Lawrence River, immediately opposite the City of Montreal. This is a branch of the world renowned engineering firm of Sir W. G. Armstrong, Whitworth & Co. Ltd., of England.

This plant was used before and during the war for the manufacture of steel. The reconstruction of the works is proceeding rapidly and it is anticipated that operations will be in full swing in about a month. The company will manufacture complete paper and board machines of the Walmsley design, the new Magazine Grinder, invented by J. J. Warren of Brownville, Me.; the Watford Engineering Co.'s Tremor Screen, and Gwynne's Centrifugal Pumps. The company will also act as selling agents for all the products of Sir W. G. Armstrong Whitworth & Co. Ltd., of England.

The new company will therefore be in a position to supply the complete equipment of a pulp and paper mill including the hydro electric power plant, the structural steel work for the buildings, the electrical apparatus roll grinders, and general machine shop equipment, all of which are manufactured by the parent company or its subsidiary undertakings.

Sir William Price, president of Price Brothers & Co. Ltd., was elected president of the company. The general manager of the company is Mr. Harry Kay, who for many years has been associated with the Walmsley Company in England in addition to having a large experience of Canadian methods gained during several years connection with Messrs. Price Brothers & Co. Ltd., of Quebec.

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS.

Wire Changes Now Made in an Hour or Less Beloit Removable Fourdrinier

IN INTRODUCING our Removable Type of Fourdrinier, it is perhaps advisable first to consider the ordinary method used in changing a wire on the machine.

As all paper makers know, it is necessary practically to wreck the Fourdrinier end in making this change. This change occurs every two to eight weeks, depending upon speed, good luck and a number of other factors. It ordinarily takes from two to six hours to make this change, depending largely upon the length of the wire, its width, number of men used in making the change, their training in this particular line, as well as facilities or handling the various heavy parts.

Beloit Removable Fourdrinier with Rails in Place

THE time element, while important, does not tell the whole story. In old types of Fourdriniers every roll has to be removed. This is a back-breaking job for the operators. It also takes the rolls out of their individual bearings, covers the operators and the rolls themselves with grease or oil and always entails the chance of damaging the rolls as they are taken out or put in. The breast roll has to be removed and the heavy suction boxes taken out and handled carefully. When all of these parts are replaced after the wire is in place, there is always the possibility of dropping a roll through the wire or crimping the edge, besides the danger of pinching the operator's fingers as the various rolls and boxes are put back into place.

To eliminate all this trouble, danger and time required, we have developed our Removable type of Fourdrinier. The Fourdrinier part is arranged so that by placing tracks on the front side of the machine, it is possible to run, by means of power, the entire Fourdrinier out to the front side of the machine, string the wire in place and then run the entire Fourdrinier back into the loop of the wire. The illustration shows the Fourdrinier with these rails in place. Wire changes are thus made in an hour or less.

Send Your Specifications to Beloit

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS.

The Crane as a Labor Saver

In these days of progress common labor has rapidly been replaced by machinery, which has proved to be a great time as well as money saver. In no other industry has the adoption of labor saving machinery been more welcomed than in the paper industry.

One of the great problems in the pulp and paper industry

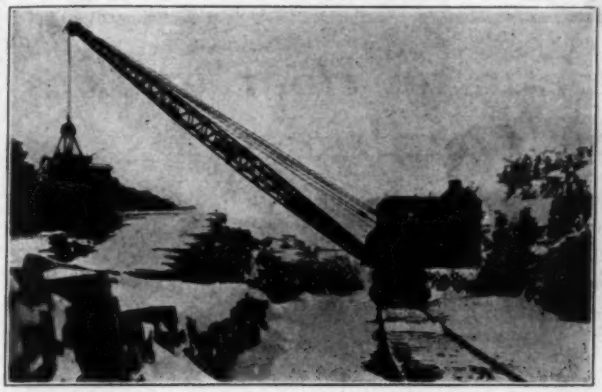


Fig. 1

is that of handling pulp logs as they come to the mill. Many different systems have been put in use for this work, all the way from building mammoth overhead stackers to the simple system of unloading the pulp logs from the freight cars by hand.

A very practical and labor saving system today that has been widely adopted by pulp and paper mills, is the use of the locomotive crane for unloading cars and stacking the wood in piles.

Figure 1 is a view of the yard of the Great Western Paper Company, of Ladysmith, Wis. This pile of wood represents over 6,000 cords of spruce pulpwood and several million feet

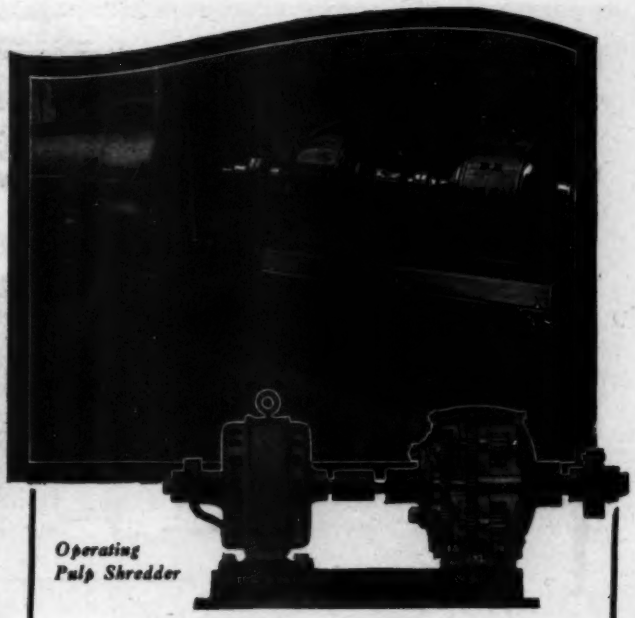
Fig. 2

of hemlock logs, all of which have been stacked by the locomotive crane shown in the picture. The boom on this crane is capable of piling logs to a height of thirty-five feet. How much human effort do you think it would take to have done this work by hand? The Great Western Paper Company also uses this same crane in the handling of their storage coal, loading scrap iron, unloading heavy machinery, digging out the hot pond and keeping it clean, etc.

The Ford Company, of Iron Mountain, Mich., has adopted this system in their lumber yards. The photograph (fig. 2) shows the method of picking the logs up from the flat cars and transferring them to the wood pile.

Many paper men endorse the locomotive crane system for handling of pulpwood on account of the low cost of operating and the large amount of wood that it can handle daily.

The National Safety Council, with headquarters at 168 N. Michigan Ave., Chicago, Ill., have published an attractive 48-page program, giving all the details of their Twelfth Annual Safety Congress to be held October 1 to 5, at the Statler Hotel, Buffalo, N. Y.



Operating Pulp Shredder

Get the Facts About Foote Speed Reducers

YOU should know all about how FOOTE SPEED REDUCERS transmit the power from electric motors to conveyors, storage tanks, mixers, and other equipment. Possibly you are wasting your money. The old method of using belting, ropes, chains, etc., is costly, for it causes lost power, requires considerable maintenance, and involves much expense.

FOOTE SPEED REDUCERS are entirely enclosed—all gears run in oil. They deliver from 86 to 94% of the motor power. They prevent accidents to workers—require practically no maintenance—are easy to install.

Let our engineers show you—without obligation—how Foote Speed Reducers can be used at a big saving in your plant.

Foote Bros. Gear & Machine Co.

Mfrs. of Bakelite Micarta Pinions and Cut Gears of All Kinds. Special Machinery Made to Order. Submit Your Blueprints.

250-260 N. Curtis St., Chicago, Ill.

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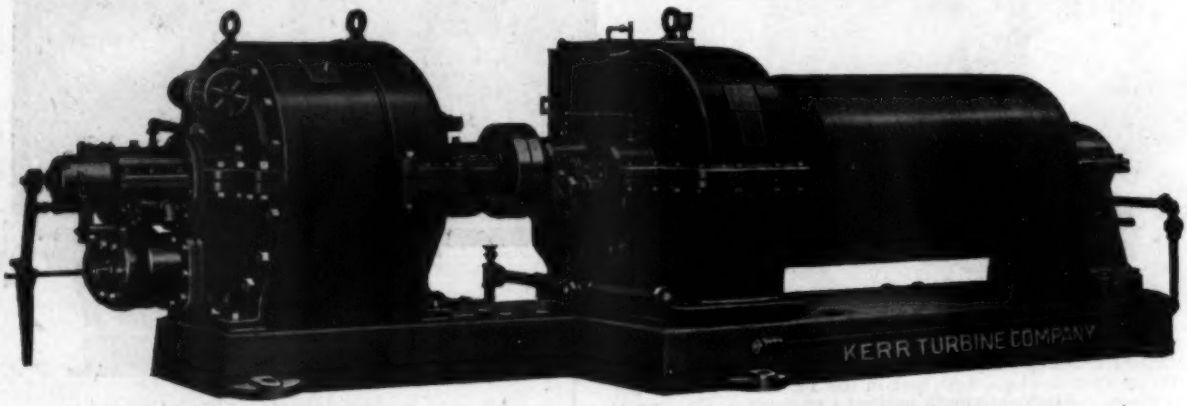
TRADE MARK TURBINES KERR GEARS

OLDEST EXCLUSIVE BUILDERS *of* STEAM TURBINES *and* REDUCTION GEARS



Kerr 650 H. P. Geared and Belted Turbine, one of four units supplied to a well known paper company in Ontario.

Power for Paper Makers

Kerr Steam Turbines have met the Paper Mill demand for efficient power with conspicuous success. Applications cover current generation, pump, blower, and machine drive, and have been direct connected, belted and geared. Kerr Turbines include high pressure, low pressure, mixed pressure, condensing, non-condensing, and bleeder types. In the 35 installations listed, 58 Kerr Turbines are employed, totalling 18,500 H. P.

The New Variable Speed Governor

We are now prepared to supply our new variable speed governor which has been specially developed for paper mill service. Particulars of course — just write the nearest representative.

Brownville Paper Co., N. Y.
D. M. Bare Paper Co., Pa.
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Bogalusa Paper Co., La.
Columbian Paper Co., Va.
Coy Paper Co., N. H.
Everett Pulp & Paper Co., Wash.
Escanaba Paper Co., Mich.
Fairfield Paper Co., Wis.
Gilbert Paper Co., Wis.
Harmony Mills, N. Y.
Hinde & Dauch Paper Co., Iowa.
International Paper Co., N. Y.
Jarvis Paper Mills, N. H.
Kimberly Clark Co., Wis.
Minnesota & Ontario P. Co., Minn.
Mountain Mill Paper Co., Mass.
Mead Pulp & Paper Co., Ohio.
Marinoth & Menominee P. Co., Wis.
Nekoosa-Edwards Paper Co., Wis.
Ontario Paper Co., Inc., Ont.
Oswegatchie Paper Co., N. Y.
Pride Pulp Paper Co., Wis.
Peshtigo Paper Co., Wis.
Richardson Co., Ohio.
River Raisin Paper Co., Mich.
St. Clair Paper Co., Ind.
St. Regis Paper Co., N. Y.
Spanish River Pulp & P. Co., Ont.
Southern Paper Co., Miss.
West Jersey Paper Co., N. J.
Wanaque River Paper Co., N. J.
Willamette Pulp & P. Co., Ore.
West Va. Pulp & Paper Co., W. Va.
West Milton Paper Co., N. Y

KERR STEAM TURBINES-REDUCTION GEARS
KERR TURBINE COMPANY
WELLSVILLE, NEW YORK U·S·A·

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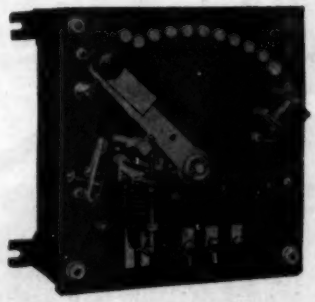
Tokio, Kongo Shokwai
Havana, 516 National Bank Bldg.

2018-27

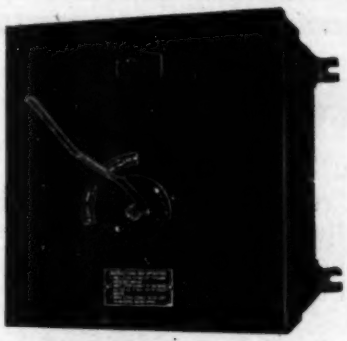
New C-H Motor Starters

The accompanying illustrations show the new open type and enclosed type Starters made by the Cutler-Hammer Mfg. Co., of Milwaukee. Both overload and no-voltage protective



C-H motor starting rheostat with latest type overload relay

relays are furnished. The overload relay is adjustable and is of particularly sturdy construction, the standard drum type finger and contact being used in the overload relay section, being mounted as shown to the left of the lever and relay. Moving the lever to the extreme left closes the over-



Showing the appearance of C-H motor starting and speed regulating rheostats with complete enclosure and exterior operating handle

load circuit. In starting, the handle is moved to the right as with the standard manual starters. The no-voltage relay magnet holds the lower part of the lever, while to increase the speed above normal the handle is moved to the left.

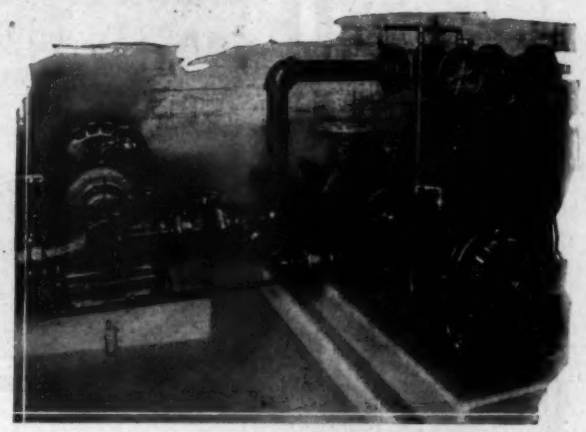
In case of serious drop in voltage, interruption in power supply or overload the handle automatically returns to the full "off" position with no resistance in the field circuit. This insures against damage since the motor on starting always has full field.

Injunction Granted in Water Softener Suit

The Permutit Company, New York, recently brought suit in the Federal Court in New York City against the Paige & Jones Chemical Company for infringement of the Permutit Company's patent covering ezolite water softening apparatus that had previously been sustained by the District Court at Buffalo and the Circuit Court of Appeals, New York. At a hearing in July, 1923, in the Federal Court, New York City, Judge Learned Hand granted an injunction against the Paige & Jones Chemical Company restraining them from further manufacturing or selling of infringing apparatus. The first suit in this patent, which was against The Refinite Company of Omaha, Nebraska, was carried to the Supreme Court of the United States which denied a writ of certiorari to review it.

An 11 inch by 14 inch card, in the shape of a calendar, showing the production, consumption, and prices of sulphur, pyrites and sulphuric acid, is now being distributed by the Freeport Sulphur Co., Parsons & Petit, Selling Agents, 63 Beaver St., New York City.

FAIRBANKS-MORSE PUMPS



Give Greater Efficiency

THE water-works equipment in this Tennessee town consists of a 5-inch two-stage centrifugal fire pump direct connected to a 75 H. P. Fairbanks-Morse motor, giving a capacity of 750 gallons per minute against a pressure of 130 lbs.

The service pump is a 3-inch single stage centrifugal direct connected to a Fairbanks-Morse motor giving a capacity of 400 gallons per minute against a pressure of 40 lbs. and is operated on the direct pressure system pumping continuously into the city mains.

Both pump and motor are manufactured by Fairbanks-Morse.

One Manufacturer
One Responsibility

FAIRBANKS, MORSE & CO.

Manufacturers Chicago

HOW LONG SHOULD A TURBINE LAST?

WHILE the life of any piece of mechanical equipment depends to a large extent on the care and attention it receives, its potential life depends upon materials and design. The illustration at the top shows a Terry Lighting Set installed in 1911 at the plant of Joseph Benn Sons, Inc. There were no shutdowns or repairs until it was overhauled in 1921 when the glands, bearings and wheel were replaced.

The Terry Boiler Feed Unit illustrated at the right was installed in 1912, a new wheel was all that was necessary when it was overhauled in 1921. By replacing these worn parts they have practically restored the turbines to their original condition. Dividing the cost of these repairs by the number of years in operation shows an exceptionally low upkeep cost per year, thus it is possible to prolong the life of the Terry Turbine indefinitely by replacing the few wearing parts. This is an important item to bear in mind when considering the first cost of your Steam Turbine.

Bulletin A-25 describes in detail the wearing parts and shows their accessible arrangement in the Turbine. Write for it and you can easily see you are making a permanent investment when you buy

THE TERRY TURBINE

Offices in Principal Cities in U.S.A. also in Important Industrial Foreign Countries

The Terry Steam Turbine Co.
Terry Sq. Hartford, Conn. U.S.A.

T-784

Abstracts from American Chemical Society Meeting

Following are several abstracts of papers to be given before the 66th General Meeting of the American Chemical Society, to be held in Milwaukee, Wis., September 10 to 14, 1923.

The utilization of waste liquor from sulphate process paper mills (the most largely used process at present) has been an extremely serious problem with the paper makers. This liquor can be successfully used, according to Ralph H. McKee, for the preparation of alcohol by a special process of fermentation which leaves a by-product of fuel considerably more than sufficient to carry out the necessary steps in the process.

The Chemistry of Wood—VII.—Ritter and Fleck. Analyses of 10 or more American species according to the methods used in former work are reported. Both heartwood and sapwood were analyzed separately in all cases. The results obtained confirm the previous analyses and no new generalization can be made.

A Study of the Chlorination Method for Determining Cellulose in Woods—Ritter and Fleck. It has been found that short chlorination periods of about 5 minutes each are as efficient as the usual longer periods of from 10 to 25 minutes. These results will not only make it possible to shorten the time required for the cellulose determination but also suggest that chlorination treatments for the commercial removal of ligneous materials could be carried out more economically in shorter periods.

Chemical Changes Caused by Decay in Groundwood—Bray and Andrews. Weighed amounts of groundwood pulp were subjected to various periods of decay and the weight and chemical composition of the partly decayed samples were determined. As in previously reported cases, the decay consists largely in the removal of cellulose, the lignin remaining practically unchanged. Even after a 2 year period, however, there was some cellulose left in the decayed pulp.

Improved Method for the Determination of the Copper Number of Cellulose—Sherrard and Blanco. This is a description of the modified method for determination of the copper number which is short and reliable and which has been found valuable in investigation of the residues left after each progressive hydrolysis of wood with hydrochloric acid.

Preliminary Work on the Partial Hydrolysis of Wood Cellulose—Sherrard and Blanco. In hydrolyzing the cellulose obtained from wood by the Cross and Bevan method by boiling with water for several hours a very readily soluble material is obtained which is apparently a polysaccharide. This is the first report of a product of this kind being obtained from wood cellulose and further study of the product may give new information on the composition of wood.

The Usefulness of X-Ray Diffraction Methods in the Study of Cellulose and Related Compounds—R. W. G. Wyckoff. This paper will not report any new work on the application of X-ray methods to cellulose, but it is intended to give cellulose chemists some idea of what use can be made of this physical method in solving their problems on the constitution of cellulose.

The Viscosity of Cotton Cellulose—J. O. Small. The use of cotton cellulose as a raw material for many industries has become widely extended and from a practical point of view, viscosity is its most important physical property. A brief outline is given here of factors which are believed to influence viscosity from the growth of the cotton plant until the purification treatment has been completed. A method is described which has been used for determining the viscosity of cotton cellulose in cuprammonium solution.

A Liquid Sulfur Dioxide Process for Sulphite Pulp—Ralph H. McKee and Donald E. Cable. There are several species of coniferous woods which are only unsuited for manufacture into sulphite pulp because of their high content of resinous matter. The process proposed here consists in chipping such wood, dissolving out the turpentine and rosin from these chips by use of liquid sulfur dioxide as a solvent, and then cooking the chips with the ordinary "sulphite acid." The pulp obtained is a good quality sulphite pulp. Furthermore, this process gives promise of yielding commercial quantities of turpentine and rosin as by-products at less expense than encountered in any of the present methods of isolation. Certain variables in the above extraction as studied experimentally are discussed. A few mechanical difficulties have been discovered, but have been satisfactorily solved.

Proper Use of Sulphite Waste Liquor—Ralph H. McKee. To properly utilize sulphite waste liquor requires that it all be utilized and that no objectionable residue be emptied into the streams. The author shows that this can be accomplished, and with large financial profit, by fermenting by a new proc-

If You Were a Coal Dealer

If you were a coal dealer, you wouldn't think of permitting your coal to be unloaded by hand, because you're the type of business man that believes in modern equipment for saving time, power, labor and money.

You would have an up-to-date establishment like all progressive dealers have today. It would probably consist of elevated bins where wagons and trucks could be loaded automatically. The bins would receive their supply of coal from hopper-bottom cars by means of a **Godfrey Conveyor.**

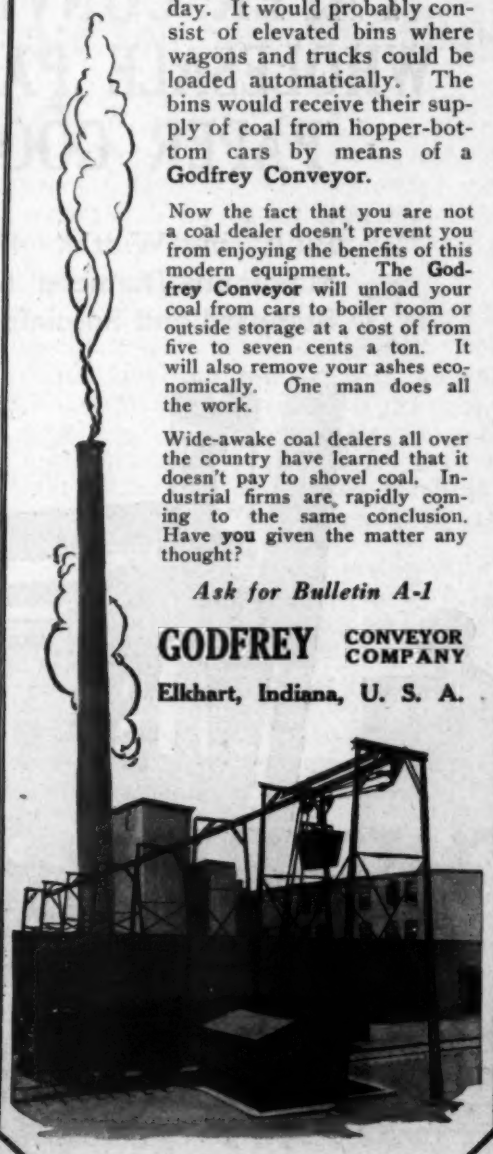
Now the fact that you are not a coal dealer doesn't prevent you from enjoying the benefits of this modern equipment. The **Godfrey Conveyor** will unload your coal from cars to boiler room or outside storage at a cost of from five to seven cents a ton. It will also remove your ashes economically. One man does all the work.

Wide-awake coal dealers all over the country have learned that it doesn't pay to shovel coal. Industrial firms are rapidly coming to the same conclusion. Have **you** given the matter any thought?

Ask for Bulletin A-1

GODFREY CONVEYOR COMPANY

Elkhart, Indiana, U. S. A.



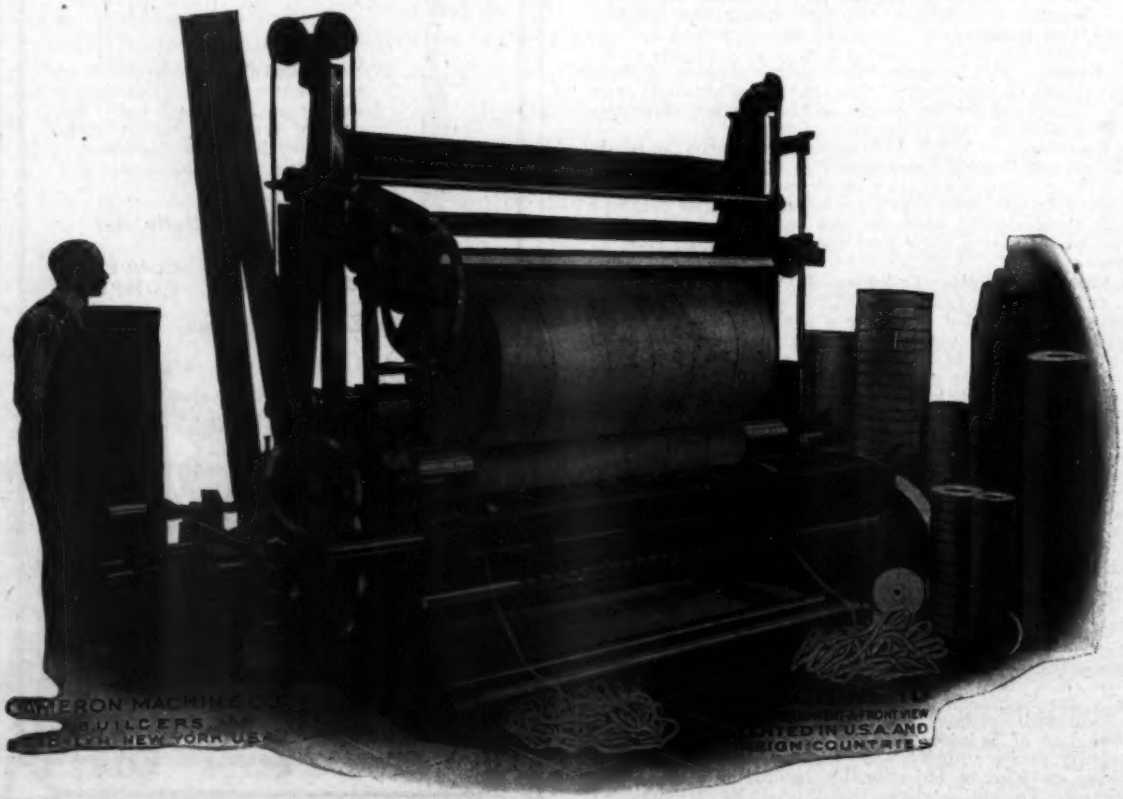
CAMACHINE

CAMACHINE 10 MODEL 10

A Cameron Slitting and Roll-Winding Machine for Universal Service in

PAPER MILL FINISHING ROOMS
PAPER CONVERTING PLANTS
WHOLESALE PAPER WAREHOUSES
PAPER GOODS FACTORIES

Built in Widths 42" - 52" - 62" - 72" - 82" x 36"
Maximum Diameter for Small to Medium Large Standard and Specialty Rolls of Paper and Board.



ess, but one which has been tried in commercial size units, and after distilling off the commercial grade alcohol, evaporating the residual material and using it as fuel. The fuel obtained from an average pulp mill is adequate to give a thousand horsepower day and night, and in addition more than sufficient steam to do all the evaporation required.

The Effect of Temperature in the Determination of Cellulose in Woods—S. A. Mahood and J. L. Ebaugh, Jr. Data from preliminary experiments, presented by one of us at the Birmingham meeting showed that the effect of temperature in the determination of cellulose in woods is negligible. This conclusion has now been confirmed by a further study of this phase of the determination for temperature ranging from 0° to 30°. The results are in accord with those of Sieber and Walter but contrary to those of Cross and Bevan and to the view of Renker.

Chemical Exposition Give Students Course

The Ninth National Exposition of Chemical Industries, which will be held at the Grand Central Palace, New York City, September 17 to 22, have announced their intention of giving a short course on the fundamentals of chemical engineering and industrial chemical practice to students of chemical engineering or industrial chemical practice throughout the country. This course will be under the general direction of Professor W. T. Read, of Yale University.

Lectures will be given by men prominent in various phases of the chemical engineering industries. They will be supplemented by group conferences and supervised inspection of the exhibits. A report or examination on certain phases of the course may be required by the committee.

The following topics will be included in the course:

1. Plant Equipment in the Chemical Engineering Industries.
   - (a) Disintegration—Crushing and Grinding.
   - (b) Mechanical Separation—Grading.
   - (c) Separation of Solids from Liquids—Thickening, Filtration, Centrifugal Separation.
   - (d) Separation with Phase Change—Evaporation, Distillation, Drying.
   - (e) Handling of Materials.
2. Materials of Construction:
   What material to use, when, where and why.
3. Chemicals in Commerce:
   The distribution of chemicals.

No charge will be made to the students attending this course. The Columbia University has offered the use of its dormitories during the week of the Exposition making a special rate to these students.

Motion Picture Program

The Exposition has arranged for the showing of the following films:

"The Story of Duriron as a Non-Corrodible Material for Chemical Apparatus." (1 reel) Courtesy of the Duriron Company.

"Operations of a Nickel Rolling Mill Producing Sheet and Wire." (5 reels) Courtesy of International Nickel Company.

"The Story of Sulphur and How it is Secured." (2 reels) Courtesy of U. S. Bureau of Mines and Texas Gulf Sulphur Company.

"The Story of Asbestos and Its Manufactures." (4 reels) Courtesy of the Johns-Mansville Company and U. S. Bureau of Mines.

"Saving Coal in the Home." (1 reel) Courtesy of U. S. Bureau of Mines.

"The Diary of an Abrasive Stone." (4 reels) Courtesy of U. S. Bureau of Mines and Carborundum Company.

"Water Power." (2 reels) Courtesy of U. S. Bureau of Mines and Westinghouse Electric and Manufacturing Company.

"The History of Transportation." (2 reels) Courtesy of U. S. Bureau of Mines and Westinghouse Electric and Manufacturing Co.

"The Story of Motor Truck Transportation." (3 reels) Courtesy of U. S. Bureau of Mines.

"Story of Steel." (6 reels) Courtesy of U. S. Bureau of Mines.

"When Wages Stop: Showing Safety First in the Petroleum Industry." (4 reels) Courtesy of U. S. Bureau of Mines.

The usual meeting of the American Ceramic Society will be held in conjunction with the Exposition in the Grand Central Palace on September 19th, probably extending over several days. The regular dinner of the American Institute of Chemical Engineers will be held on Wednesday evening, September 19th, at the Park Avenue Hotel, reservation for

Cleveland Worm Gear Reduction Unit applied to ground wood press. Motor 10 H. P. at 1200 R. P. M. Reduction in worm drive 40 to 1.

Are You Sure You Know?

ARE you sure you know what the Cleveland Worm Gear Reduction Unit is? Have you ever **seen** this modern factor in the business of speed reduction? Do you realize that it is a positive contribution to present-day for lower factory costs?

The Cleveland Worm Gear Speed Reduction Unit does away with belts, chains and open gearing, with unsightly dust-catching guards. It eliminates transverse loads from bearings supporting connected shafts. It reduces the cost of speed reduction by bringing it down to a scientifically engineered basis.

The Cleveland Worm Gear Speed Reduction Unit consists of a modern type of worm and gear made of proper materials and correctly designed to transmit power with minimum loss and maximum quietness. There is no mystery about the design nor about the success that has attended the use of Cleveland Worm Gearing in many different types of industry.

Write for full information

The Cleveland Worm & Gear Co.

America's Worm Gear Specialists

CLEVELAND, OHIO

Cleveland
WORM GEAR
REDUCTION UNITS

We are STILL furnishing

FOURDRINIER WIRES

to the Paper Mills which used APPLETON WIRES No. 1, No. 2 and No. 3, shipped 27 years ago this spring

They tell us that

"Appleton Wires Are Good Wires"

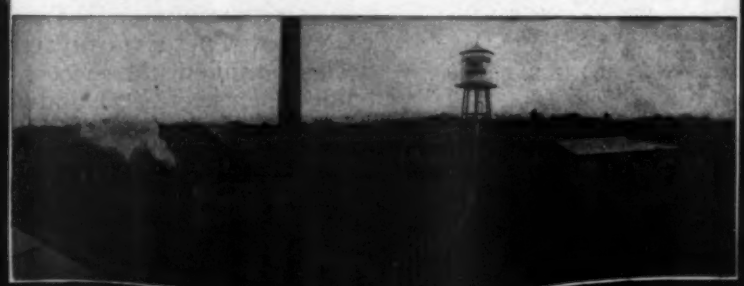
in fact the best they have run

Fourdrinier Wires
Cylinder Wires
Washer Wires
Save-All Wires

In Brass and Phosphor Bronze

APPLETON WIRE WORKS

Appleton, Wis., U. S. A.



which would be sent to Dr. John C. Olsen, the Secretary, at 85 Livingston Street, Brooklyn, N. Y.

The Technical Association of the Pulp and Paper Industries which will hold its annual fall meeting again this year in conjunction with the Chemical Exposition at the Grand Central Palace, New York, on September 20th at 2:30 P. M., has announced six speakers for the occasion. T. L. Crossley, "Pulp and Paper Magazine of Canada," will talk on the "Attitude of Men to Educational Opportunities to Study in Pulp and Paper Mills"; Hubb Bell, United States Testing Company, "The Standardization of Paper by Test"; N. W. Sultzer, Research Corporation, "Application of the Cottrell Electrical Precipitator to the Pulp and Paper Industry"; J. H. MacMahon, Mathieson Alkali Works, "Preparation of Bleaching Liquors from Liquid Chlorine"; R. F. Bacon, Texas Gulf Sulphur Company, "The Mining of Sulphur"; James G. Vail, Philadelphia Quartz Company, "Silicate of Soda in the Paper Mill."

The Forest Resources of the World

Occasionally a book is produced to which the term "Monumental" may be applied without serious exaggeration. This is true of "Forest Resources of the World," which is the result of generous co-operation on the part of the United States Department of Agriculture, the National Research Council and the McGraw-Hill Book Company. Never before has there been brought between four covers (there are two volumes) the essential facts and available statistics which show the present status of the world's timber supply and consumption in terms of an understandable common denominator. All areas are given in acres and volumes in board feet, cubic feet or cords as is most appropriate to the particular subject under consideration.

Some idea of the magnitude of the undertaking may be gained from the statement that in addition to a general summing up for each Continent there are separate discussions of the forest situation in each political or other important subdivision of the world. In other words, besides an excellent summation of the forest resources of Europe as a whole there are sections devoted to detailed exposition of the status of each of the 29 political or geographical sub-divisions of that Continent. The same treatment is given to 35 divisions of Asia, 50 divisions of Africa, 20 divisions of Australia and Oceania, 13 divisions of South America and 29 divisions of Central America, North America and the West Indies, making a total of 176 regions for which there is an attempt to show in each case the forest area, the annual growth and the annual cut. A detailed discussion including the most important statistics and best estimates where statistics are lacking covers the topics of forest area, character and distribution of forest, character of ownership, annual growth, annual cut, exports and imports, domestic consumption, progress in forest conservation and probable future developments. There is also a discussion of the sources of other valuable forest products such as resins, gums, balsams, dyewoods and edible products.

The final result is two clearly written, well-manufactured and typographically attractive volumes, which contain 26 colored plates, showing forest classification in the most important regions, more than 400 statistical tables and a total (including an excellent index) of nearly 1,000 pages numbered consecutively from the first page of the first volume to the last page of the second volume.

Some conclusions of the authors, Messrs. Raphael Zon and William N. Sparhawk, Forest Economists of the United States Forest Service, are of especial interest. For example, it is stated that for the world as a whole the coniferous forests occupy about 35% of the total forest area, the temperate hardwoods 16% and the tropical hardwoods about 49%, but that 95% of the coniferous forests, upon which the world depends for its construction material and most of its paper, are in the north temperate zone as are 89% of the temperate hardwood forests. This zone has three-quarters of the world's population and consumes an even greater share of the timber used in the world.

After a discussion of the probable future needs for agricultural land and further increases in the demand for timber the conclusion is reached that for the world in general

> "The forests will continue to be reduced in area, and the quality of those remaining will tend to deteriorate, until the timber resources become so badly depleted that steps are taken to prevent further destruction and to build them up on a permanent basis. The history of forestry in most countries shows that effective steps toward forest regulation are seldom taken until a country's forest resources have become so depleted as to make

HOFFMANN

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"R" TYPE

Made to standard metric dimensions in light, medium and heavy series. Interchangeable in size with standard ball bearings. Made to inch dimensions in light and medium series.

Heavy-duty units built to the highest standards of precision; affording maximum serviceability under conditions involving heavy loads, temporary overloads, shock, jars and vibrations: offering new opportunities for power saving and reduced upkeep costs.

Our engineers will welcome an opportunity to work with yours, in the application of these high-duty, high-precision bearings to paper machinery, with a view to securing maximum anti-friction efficiency, minimum maintenance costs, and continuity of service.

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Anable Avenue
Long Island City New York
MAKERS OF "NORMA" PRECISION BALL BEARINGS

The COE AUTOMATIC ROLLER DRYER

FOR HEAVY INSULATION BOARDS

THE manufacture of wall board, or insulation board, from waste products such as ground wood and sulphite screenings, old paper, flax, cotton stalks, straw, bagasse, etc., is constantly increasing and has wonderful commercial possibilities. The great problem has been the drying of such boards containing a large percentage of water.

We have the DRYER for this work—will dry boards of practically any description continuously, under high temperatures, flat, uniform, and very rapidly. One dryer will usually handle the entire plant production, economizing space, steam and power.

Why permit your production to suffer for lack of drying capacity?

Write us for details and estimates for any tonnage, and actual tests and surveys can be made if not too elaborate, without charge.

THE COE MANUFACTURING CO., Painesville, Ohio, U. S. A.

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H. R. MASTERS
549 W. Washington Blvd.
Chicago, Ill.

Eastern Representative
J. O. ROSS ENG. CORP.
30 East 42nd St.
New York City

it anxious regarding its own future supplies of timber."

At the present time it is said that only 10% or 15% of the world's timberland is being handled as a renewable continuously productive resource, while an additional 15% or 20% is more or less protected from destruction, but that 65% to 75% receives no care whatever. By far the greater part of the conservatively managed timberland is in public ownership and public regulation of private forests, with few exceptions, is extended only to those classed as protection forests, whose preservation is a public necessity. On the much-debated question of the public regulation of private forests, the following quotation is pertinent:

> "That it is much more feasible to regulate cutting on public forest lands than on those belonging to private individuals has been proved by the experience of several countries. Norway, France, Germany, Belgium, Italy, and others have been gradually taking back into public ownership the private forest lands whose preservation cannot safely be entrusted to private owners, and only recently the United States has undertaken a similar policy, in the purchase of forest lands by the Nation and the individual States. Canada, on the other hand, has retained most of her timberland, and can adopt conservative methods of handling it without being hampered by conflicts with private property rights. In this respect most of the tropical countries have the advantage of still owning the greater part of their forests. As soon as economic conditions require it, they will be able to profit by the experience of the older nations, and to organize their forests as permanent sources of timber both for domestic consumption and for supplying the world markets."

It is easy to criticize minor details in an undertaking of such size, but the value of this publication and its scope so far exceed anything hitherto attempted that the highest praise for substantial accomplishment is due to all who participated in the preparation and publication of these attractive volumes. There are, of course, many cases in which accurate statistics and even statistics of any kind are unavailable. Under such circumstances, it is most helpful to use the best estimates that can be made until better can be obtained and this the authors have not hesitated to do. The publication of the results of this study of the forest resources of the world comes at a time when such information is greatly needed and when more than ever before the people are waking up to a realization of the necessity for greater care for a basic natural resource.

A study of these volumes convinces us again that the United States and Canada, which once possessed the greatest forest wealth on the globe, cannot safely rely on outside sources for their future raw material for lumber, paper and a multitude of other wood products, but that they can and must produce their own. This work of reference should be on the book-shelf of every student of forest economics, every producer of wood products and every citizen who takes an interest in the sound development of the natural resources of his country.—R. S. Kellogg.

American Pulpwoods

By SIDNEY D. WELLS

(Continued from August issue)

RED MAPLE—Acer rubrum. Wt. 30 lbs. Fiber .8 m.m.

Range—From New Brunswick, Quebec and Ontario (latitude 49 degrees) to Florida (Caloosa and Indian rivers); west to Lake of the Wood, eastern Dakota and Nebraska, Oklahoma and Texas (Trinity river).

Common Names—Red maple (Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., Del., Va., W. Va., N. C., S. C., Ga., Fla., Ala., Miss., La., Tex., Ky., Mo., Ill., Ind., Ohio, Ont., Iowa, Wis., Neb.); swamp maple (Vt., N. H., Mass., Conn., R. I., N. Y., N. J., Pa., Del., N. C., S. C., Fla., Ala., Miss., La., Tex., Mo., Ind., Ont., Minn.); soft maple (Vt., Mass., N. Y., Va., Miss, Mo., Ill., Ind., Ohio, Ont., Mich., Kan., Neb., Minn.); water maple (Miss., La., Tex., Ky., Mo.); white maple (Me., N. H.); shoe-peg maple (W. Va.); erable (La.); Ah-weh-hot-kwah—"Red Flower" (Onondaga Indians, N. Y.); scarlet maple (Tex.).

Sulphite Pulp—

Yield 1,450 lbs.

Character—

Easily pulped and bleached.

Very weak and rather poor color.

Possible uses—Same as aspen.

Soda Pulp—

Yield 1,300 lbs.

HAMILTON ENGINES

A View in One of the HAMILTON Foundries

Instead of Trouble—*Power*

*"Our Hamilton Corliss Engine was purchased from your firm about nineteen years ago. It has run steadily ever since, with scarcely any trouble or annoyance."**

No chances are taken with HAMILTON Engines. They are designed right and built right. From the foundry—where every "pour" is tested—through the machine shop, every step is rigidly checked. That is why HAMILTON Corliss, Uniflow and Poppet Four-Valve Engines solve the problems assigned them: they produce power dependably and economically.

**The name of this satisfied customer, together with hundreds of others, will be furnished on request, as well as our bulletins.*

The Hooven, Owens, Rentschler Co.

Hamilton Engines and Machinery

HAMILTON, OHIO

Layne Well Water System

YOUR WATER SUPPLY GUARANTEED

"Layne well water installation, producing 1,000,000 gallons a day on preliminary test."

Advantages of the Layne Well Water System

1. Specific quantity of water guaranteed.
2. Power cost known before contract is signed.
3. Responsibility rests with one company.

WATER OR NO PAY

When you buy equipment today it is essential that the manufacturer be responsible for the product he sells. He must be responsible to the extent of making good any defective parts and to see that the customer is entirely satisfied in every way. In a water supply system upon whom can you place the responsibility in case of dissatisfaction? The pump, the screen, the well and the pipe are parts of the complete system. But is any individual firm responsible for the adequate and continual supply of well water—in the ordinary way of contracting—NO. In the Layne well water system—YES. From us you can contract for water and leave the entire responsibility up to us. We guarantee to produce on your property a specific quantity of water for a stipulated price. We take all the responsibility. One of our engineers will investigate your water supply problem at your request.

LAYNE & BOWLER CO., Memphis, Tenn.

FACTORIES: MEMPHIS, TENN.; LOS ANGELES, CAL.; HOUSTON, TEXAS

ASSOCIATE COMPANIES

In order to better serve our customers with Layne Pumps and Layne Water Systems, we have seen the desirability of getting the "brains closer to the jobs." We have accomplished this through the organization of associate contracting companies made up of tried and proven members of the Layne & Bowler organization—men of both technical and practical engineering training—men who are able to "cope" with the difficult problems that arise in attempting to procure ground water in maximum quantities.

Our success in the last analysis depends upon service rendered to the customer. These men realize this, and we feel that we are in better position by this arrangement to serve our past customers and to do better work for new ones. These men are anxious to do it.

For serving the trade in the various territories we have created:

Layne New York Co., Room 1871, 50 Church St., N. Y. City
Layne & Bowler Chicago Co., 800 Old Colony Bldg., Chicago, Ill.
Layne Arkansas Co., Stuttgart, Ark.
Layne Ohio Co., Wyoming Station, Cincinnati, Ohio
Layne Southeastern Co., 1st Nat'l Bk. Bldg., St. Petersburg, Fla.
Layne Central Co., Memphis, Tenn.
Branch Office, Crowley, La.

Character—
Easily pulped and bleached.
Soft opaque and short fiber.
Possible uses—Same as aspen.
Mechanical Pulp—
Probably the same as black gum.

SUGAR MAPLE—Acer saccharus. Wt. 35 lbs. Fiber ———.
Range—From southern Newfoundland (along the St. Lawrence and Saguenay rivers, Lake St. John and northern borders of Great Lakes) to Lake of the Woods and Minnesota; south (through the Northern states and on the Allegheny mountains) to northern Georgia and western Florida; west to eastern Nebraska, eastern Kansas and eastern Texas.
Common Names—Sugar maple (Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., Del., Va., W. Va., N. C., S. C., Ala., La., Ky., Mo., Ohio, Ill., Ind., Iowa, Kans., Nebr., Mich., Minn., Wis., Ont.); hard maple (Vt., R. I., N. Y., N. J., Pa., Va., Ala., Ky., Mo., Kans., Nebr., Ill., Ind., Iowa, Mich., Ohio, Minn., Ont.); sugar-tree (Me., Vt., R. I., Pa., Va., W. Va., Ala., Miss., Ark., Ky., Mo., Ill., Ind., Ohio, Kans.); rock maple (Me., Vt., N. H., Conn., Mass., R. I., N. Y., Tenn, Ill., Mich., Iowa, Kans., Wis., Minn., Ont.); black maple (Fla., Ky., N. C.); maple (S. C.).
Sulphite Pulp—
Yield 1,540 lbs.
Character—
Easily pulped and bleached.
Very weak but excellent color.
Possible uses—Same as aspen.
Soda Pulp—
Yield 1,500 lbs.
Character—
More difficult to pulp and bleach than aspen.
Soft, opaque, short fiber.
Possible uses—Same as aspen.
Mechanical Pulp—
Probably similar to black gum.

PAPER BIRCH—Betula papyrifera. Wt. 34 lbs. Fiber 1.2 m.m.
Range—From Labrador to Hudson bay (southern shores), Great Bear lake, Yukon river and coast of Alaska; southward to New York (Long Island) and northern Pennsylvania, central Michigan and Minnesota, northern Nebraska (Bluffs of Niobrara river), Dakota (Black Hills), northern Montana and northwestern Washington (near Seattle).
Common Names—Paper birch (N. H., Vt., Mass., R. I., Conn., N. Y., Wis., Mich., Minn., Ont.); canoe birch (Me., Vt., N. H., R. I., Mass., N. Y., Pa., Wis., Minn., Mich., Ont.); white birch (Me., N. H., Vt., R. I., N. Y., N. J., Wis., Minn., Mich., Nebr., Ont.); silver birch (Minn., N. Y.); large white birch (Vt.); boleau (Quebec).
Sulphite Pulp—
Yield 1,500 lbs.
Character—
Easily pulped.
Difficult to bleach.
Poor strength and color.
Possible uses—Few.
Soda Pulp—
Yield 1,350 lbs.
Character—
More difficult to reduce than aspen.
Soft, easily bleached and opaque.
Possible uses—Same as aspen.
Mechanical Pulp—
Yield 3,000 lbs.
Short fiber and poor strength.
Pinkish color.
Possible uses—As a filler with long-fibered stocks.

YELLOW BIRCH—Betula lutea. Wt. 34 lbs. Fiber 1.5 m.m.
Range—From Newfoundland and along the northern shores of St. Lawrence gulf to Abitibi lake and Rainy river; southward to northern Minnesota and through the Northern states to eastern Tennessee, North Carolina and Delaware.
Common Names—Yellow birch (Me., N. H., Vt., Mass., Conn., R. I., N. Y., N. J., Pa., N. C., S. C., Ill., Mich., Wis, Minn., N. Dak., Ont.); gray birch (Vt., R. I., Pa., Mich., Minn.); swamp birch (Minn.); silver birch (N. H.); merisier (Quebec); merisier rouge (Quebec).
rouge (Quebec).
Sulphite Pulp—
Yield 1,590 lbs.
Character—
Easily pulped.
Easily bleached.

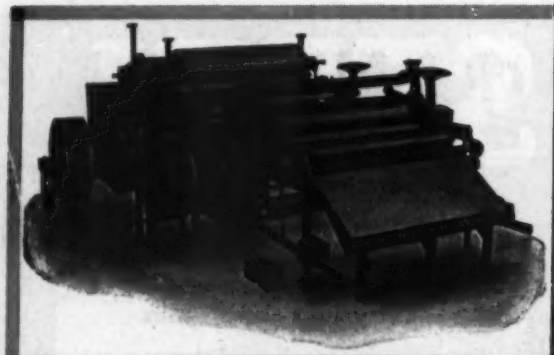
STEEL
for Immediate Shipment from Stock
For Maintenance, Construction and Repairs

Bars	Boiler Tubes
Shapes	Boiler Fittings
Structurals	Corrugated Sheets
Rails	Concrete Reinforcing
Plates	Welding Rods
Sheets	Babbitt Metal
Rivets	Tool Steel
Bolts	Bar Iron
Nails	Refined Iron
Wire	Floor Plates
Chain	Safety Treads
Turnbuckles	Small Tools
Shafting	Machine Tools, etc.

Write for the Ryerson Journal and Stock List —the "Key" to Immediate Steel
JOSEPH T. RYERSON & SON INC
CHICAGO ST. LOUIS CINCINNATI DETROIT BUFFALO NEW YORK

TAYLOR'S SPIRAL RIVETED PRESSURE PIPE
TAYLOR'S SPIRAL RIVETED PIPE
For many years the preferred piping in Paper and Pulp Mills
LIGHT STRONG DURABLE

Sheet Steel Fittings Made to Individual Requirements
AMERICAN SPIRAL PIPE WORKS
P. O. BOX 485 CHICAGO



Rogers and Special Wet Machines

SINGLE AND DOUBLE PRESS
FOR CONVERTING CHEMICAL PULP INTO SHEETS 48% DRY

25-30 TONS air-dry pulp per 24 hours. Built in 72" width only, with patented pulp weakening and separating device or our new automatic knife cut-off attachment.

FREIGHT CHARGES are greatly reduced. Savings on this item alone often pay for the machine in one year.

All infringements will be vigorously prosecuted

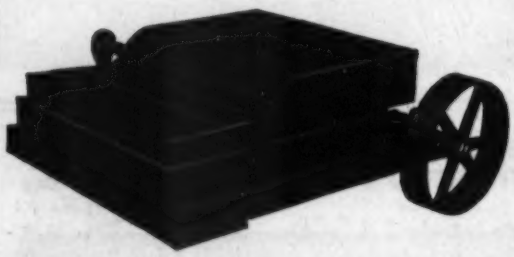
The Wood's Machine

Used as Pulp Thickeners, Savealls, Pulp Washers and Water Filters

ADVANTAGES:

Reduced Wire Costs	No Couch Roll
Enormous Capacity	Minimum Repairs
Only 2 H. P. Required	No Doctor
Works Automatically	Requires No Attention

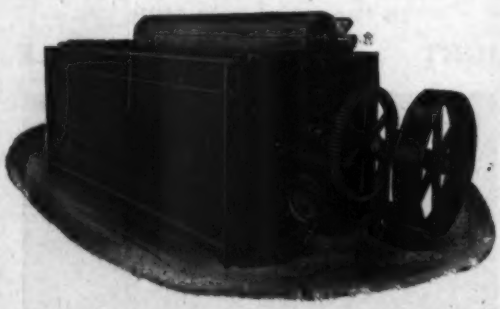
OVER 125 MACHINES SOLD AND IN USE



Wells Undulating Knot and Sliver Screen

Will bear closest investigation from every angle. It separates knots and slivers from all kinds of pulp efficiently, continuously, automatically with negligible cost for operation and upkeep. Simple but rigid construction. Only best materials used. Operation in plain view.

60 TONS DAILY CAPACITY, STANDARD SIZE. WRITE FOR BLUEPRINT AND FURTHER INFORMATION



Improved Decker

Single or Double Cylinder Type

Built in the following sizes:

Cylinder mould diameter, 36" or 40".

Face of cylinder mould, 72", 84" or 96".

Cylinder mould of best reinforced construction and properly supported with our latest design outside bearings.

Vat furnished either all wood or with cast-iron ends.

For Stability and Efficiency our Improved Deckers are Unexcelled

PULP AND PAPER MILL MACHINERY
GLENS FALLS MACHINE WORKS

GLENS FALLS, NEW YORK

OUR LINE IS MANUFACTURED IN CANADA BY

THE NORTHERN FOUNDRY & MACHINE CO., LTD., SAULT STE. MARIE, ONT.

Very weak.
Good color.
Possible uses—Same as aspen.
Soda Pulp—
Yield 1,360 lbs.
Character—
More difficult to reduce than aspen.
Soft, easily bleached.
Possible uses—Same as aspen.
Mechanical Pulp—
The same as paper birch.

BEECH—Fagus atropunicea. Wt. 36 lbs. Fiber 1.1 m.m.
Range—Nova Scotia to Lake Huron (north shores) and northern Wisconsin; south to western Florida and west to southeastern Missouri and Texas (Trinity river).
Common Names—Beech (Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., Del., Va., W. Va., N. C., S. C., Ga., Ala., Fla., Miss., La., Tex., Ark., Ky., Mo., Ohio, Ill., Ind., Mich., Nebr., Minn., Ont.); red beech (Me., Vt., Ky., Ohio); white beech (Me., Ohio, Mich.); ridge beech (Ark.).
Soda Pulp—
Yield 1,530 lbs.
Character—
Slightly more difficult to reduce than aspen.
Soft, easily bleached.
Possible uses—Same as aspen.

BLACK GUM—Nyssa sylvatica. Wt. 30 lbs. Fiber 1.7 m.m.
Range—From Maine (Kennebec river) to Florida (Kissimmee river and Tampa bay) and west to southern Ontario, southern Michigan (up to Gratiot county), southeastern Missouri and Texas (Brazos river).
Common Names—Black gum (N. J., Pa., Del., Va., W. Va., N. C., S. C., Ga., Ala., Fla., Miss., La., Tex., Ill., Ind.); sour gum (Vt., Mass., R. I., N. Y., N. J., Pa., Del., Va., W. Va., S. C., Fla., Tex., Ohio, Ind., Ill.); tupelo (Mass., R. I., N. J., Del., S. C., Ala., Fla., Miss., Tex., Ill., Ohio); pepperidge (Vt., Mass., R. I., N. Y., N. J., S. C., Tenn., Mich., Ohio, Ont.); wild peartree (Tenn.); yellow gum tree (Tenn.); gum (Md.); stinkwood (W. Va.); tupelo gum (Fla.).

Soda Pulp—
Yield 1,300 lbs.
Character—
Soft.
A little harder to cook and bleach than aspen.
Possible uses—Similar to aspen.
Mechanical Pulp—
Yield 2,610 lbs.
Character—
Very short but tough fiber.
Very white color.
Possible uses—As a filler with longer fibered stock.

COTTON GUM—Nyssa aquatica. Wt. 29 lbs. Fiber 1.6 m.m.
Range—Coast region from southern Virginia to northern Florida and through the Gulf states to Texas (Nueces river); northward through Arkansas, west Tennessee and Kentucky, southern and southeastern Missouri to southern Illinois (lower Wabash river).
Common Names—Large tupelo (Ala., La., Tex.); tupelo gum (Ga., Ala., Miss., La.); sour gum (Ark., Mo.); swamp tupelo (S. C., La.); cotton gum (N. C., S. C., Fla.); tupelo (N. C., S. C.); wild olive tree (La.); Olivier a' grandes feuilles (La.); Oliver tree (Miss.); bay poplar (Ala.).
Sulphite Pulp—
Yield 1,160 lbs.
Character—
Easily pulped.
Easily bleached.
Poor strength.
Fair color.
Possible uses—Same as aspen.
Soda Pulp—
Yield 1,200 lbs.
Character—
Soft but harder to bleach than aspen.
Possible uses—Same as aspen.

(Continued in October issue)

Contest for Association Seal

A cash prize of $50 is offered by the Tissue Paper Manufacturers Association for the best design for an Association seal.

No one is barred from entering this competition as long as their design is submitted before September 15. All designs are to be done with India Ink on White Wedding Bristol, 5 x 6. The name and address is not allowed to be on the same

COMBATING CORROSION

PROTECTION, durability, economy and good appearance, the qualities demanded in an efficient paint for steel structures and equipment, are all embodied in Bitumastic Solution.

Protection Possessing the well known preservative qualities of bitumen, Bitumastic Solution gives real protection. It prevents contact between the steel and surrounding air and moisture and so prevents corrosive action. It is not affected by moisture, weather conditions, sulphurous gases and other chemical fumes. It stands up exceedingly well against high temperatures, its heat resisting quality being a prime feature.

Durability Bitumastic Solution is exceptionally long-lived. It bonds firmly to the surface painted. Will not chip or peel. Does not dry out or evaporate leaving a porous coating of pigment, but retains its integrity for a prolonged time.

Economy Economy is the direct result of the durability of Bitumastic Solution. Giving long-time service, frequent repainting is not necessary, saving not only the cost of paint, but also the labor of application, which is far more costly.

Appearance Bitumastic Solution has a high, glossy finish that adds to the appearance of any plant, factory, building or piece of equipment. Its hard surface sheds dust instead of allowing it to cling. The gloss does not wear off in a short time, but remains bright and shiny and gives a sense of satisfaction and pride to the owner or engineer.

Uses Among the many purposes for which Bitumastic Solution is used are the protection of sheet metal roofs and buildings, structural steel, steel sash, boiler fronts and breechings, stacks, pipes, tanks, air washers, fans and ventilating ducts and other steel structures.

Write our nearest office for information regarding the solution of any particular corrosion problem you may have, or ask for sample can.

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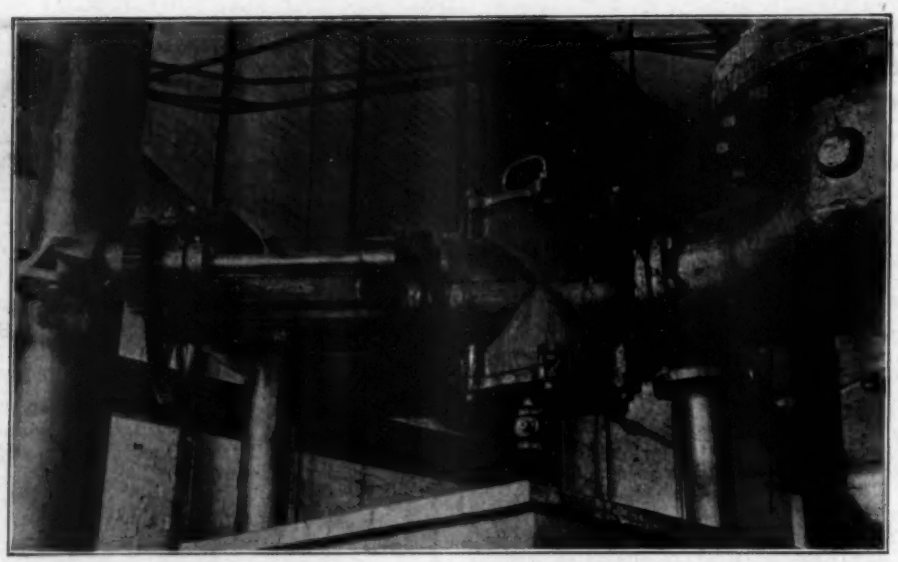


The HORKMAN

Improved Safety Blow-Off Valve (pat.)

The illustration above shows an actual and a very satisfactory installation of a Horkman Safety Blow-Off Valve. This is in the Wisconsin Rapids Plant of the Consolidated Water Power and Paper Company.

Let us mail you more detailed specifications.

Henry Horkman NEENAH WISCONSIN

sheet as the design but are to be written on a separate sheet.

All contestants are to send their designs to E. H. Naylor, Secretary Tissue Paper Manufacturers Association, 18 East 41st St., New York City, by registered mail. An impartial committee of three will award the prize not later than October 1.

Technical Association Papers, Series VI (1923)

The yearbook is illustrative of the broad scope of the studies carried on during the year by the Technical Association, including several important phases of waste in the industry, the wood pulp processes covering mill control and chemical research, several problems in general as well as special pulp and paper manufacturing, the physical testing of pulp and paper, plant management, industrial education and a bibliography of the year's literature on papermaking.

Among the contributors are many prominent executives and engineers of the industry although it is interesting to note the large number of junior members whose names appear as authors.

The volume opens with the very exhaustive report of the Committee on Waste, covering three subjects: White water losses, Barking drum waste and the Losses due to broke, each of which is separately treated. The report with the discussion on it, contained in the proceedings, will be found worthy of study.

Papers on the manufacturing of pulp and paper are: "Drying and Conditioning of Coated and Other Processed Papers" and "Heat Transference in Machine Room Ventilation," both by J. O. Ross; "Steam Economy in Pulp and Paper Mills," by Edward P. Gleason; and "Anti-Friction Bearings," by George H. Spencer.

Research on chemical pulp processes is dealt with in three papers, one on the soda process and two on sulphite.

Paper drying, one of the subjects of active interest among manufacturers and engineers, is covered by a very complete report containing the results of three tests with the description of the apparatus used in making them, by S. B. Jones and W. F. Goldsmith. Appended to the report is a shortened form of the paper drying code for the use of mills not equipped to make the more detailed analysis but which covers the minimum of items that are considered necessary.

Under paper testing a number of papers deal with different instruments and their results: Mullen bursting strength tester, Elmendorf tearing tester, Schooper folder, Valley size tester, and suggested method for determining the brittleness of paper. One of the most important under this heading is "The Effect of Atmospheric Humidity in the Physical Testing of Paper," by P. L. Houston and H. S. Kirkwood. The investigation was made on 13 different grades of paper from the classes of printing, wrapping and writing papers, under eight different humidity conditions from 15 per cent up to 83 per cent relative humidity. The tests made were moisture content, weight, thickness, expansion, tensile strength, elongation, rupture, folding endurance, tearing resistance and bursting strength, the results of which are given illustrated by curves.

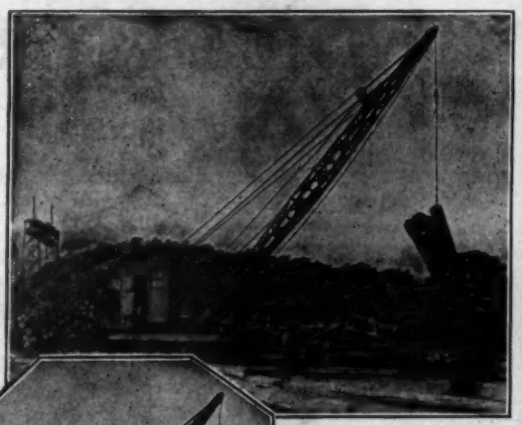
A complete bibliography of papermaking for 1922 by Clarence J. West and A. Papineau-Couture is included as well as a list of the subjects covered by the Committee on Bibliography in the forty contributions it has made since 1917.

New England

Boston, September 1—Conditions at Holyoke have been of outstanding importance. At this writing the outlook is for a speedy resumption of work in the big mills although the stationary firemen, whose strike has caused the whole trouble, still refuse to return. A wire from President Carey, however, of the International Paper Makers to the members of his union who refused to work when steam was furnished by non-union firemen, promptly sent most of the workers outside of the firemen back to their jobs. President Carey had at last discovered, after his own members had been without employment for five weeks, that the strike of the firemen was not authorized by their own union leaders.

Officials of the American Writing Paper Company had already shifted much of the business which would normally have gone to Holyoke to their mills in other parts of the country. The inactivity at Holyoke has also tended to increase the activity of independent fine paper mills in western Massachusetts.

Aside from the big fine paper mills we find activity in all departments of the paper industry on the increase. Kraft paper is a possible exception to this rule. Board mills are running five days per week with orders well ahead. Newsprint continues its record-breaking capacity production in



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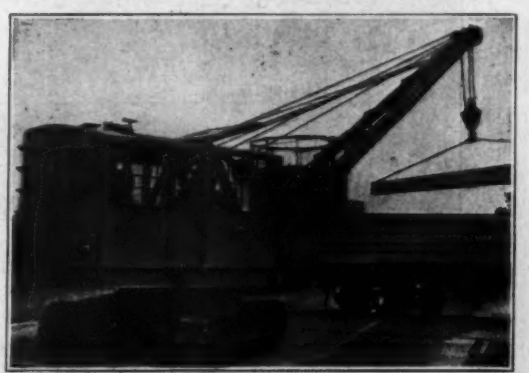

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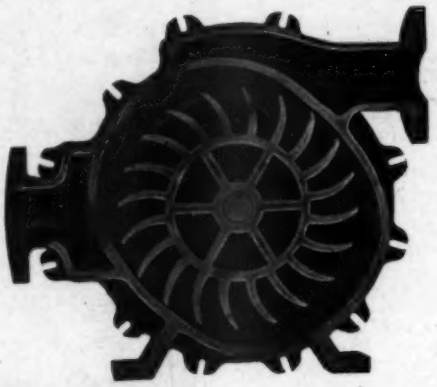

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New England as well as elsewhere. Book paper mills, whose output generally slowed down during July and August, is steadily increasing again. Three of the most important groups of book paper makers report a decided increase in orders during late August. These include the two big mills at Fitchburg, Mass., the S. D. Warren mills and the Oxford Paper Company at Rumford. The closing of one or two kraft mills ostensibly for repairs is one sign of a rather poor demand while the cutting of prices is taken as another sign of a failing interest in kraft on the part of buyers. Two of the leading New England mills dropped their price a half cent per pound within a fortnight.

Raw Materials Generally Low

New England paper mills have a golden opportunity to protect themselves against the next six months on coal at spot prices that are decidedly attractive and which average from 25c to 50c per ton under the contract market. Some contracting for New River coal over the remainder of the year was done recently at less than $6.90, the old contract price. Spot smokeless New River coal can be bought at $6.50 gross ton on cars at Boston.

Prices on rags in the Holyoke and western Massachusetts district generally are still very low. Particularly does this apply to new stock which is nominally quoted at less than the paper stock packers are themselves paying. As for instance a nominal price of 11½c on white shirt cuttings which compares to a contract price with the shirt factories of 12c to 13c. Some of the independent mills have taken very satisfactory amounts of old rags including No. 1 old whites, and twos and blues. Packers are now freely offering 6½c to 7c for No. 1 old whites, which is as high as they have paid this year. The few mills that demand linen rags are paying a very good price and the outlet continues as always, good. We have noted sales of German linens at 16c delivered.

The chief buying interest in old rope, located in Boston, has advanced his price on domestic to 5⅝c for No. 1 white Manila.

Whether, as most timber operators in the east of Canada believe, there will be no pulpwood embargo, the effect on the threat has been enough to boost prices of both wood and mechanical pulp. American grinding mills in northern New England are demanding $38 to $40 per ton for ground wood pulp f.o.b. mill. Foreign chemical pulps still rule cheap in the Boston market and we are informed that the leading Massachusetts writing mills are buying good grades of Scandinavian bleached sulphite at 4.20 to 4.50 docks.

An unfortunate situation in which the George W. Wheelwright Paper Company of Boston finds itself at the present time will probably be remedied in the near future. The company, which operates book paper mills at Wheelwright and Leominster, Mass., and owns a majority of the stock in a grease proof paper mill, the Rollstone Paper Company, at Fitchburg, Mass., has had to request its creditors to extend their claims for a six month period. A committee of creditors consisting of Amor Hollingsworth of the Penobscot Chemical Fibre Company, Morris Gintzler of the J. Andersen Company, and Walter P. Simonds of the Train Smith Company, has been formed. George W. Wheelwright, Jr., has submitted a detailed statement of the company's position, the chief feature of which is a heavy inventory and a low cash position. It is seen, however, that creditors are safe, as were the business liquidated at forced sale at current market values all claims would be met with a considerable margin to spare. The creditors have confidence in the company which is one of the oldest and most reliable in New England and there is universal belief that a few months' favorable business will enable them to work out safely.

Replying to a resolution adopted by the Essex County Board of Trade, Congressman A. Piatt Andrew very vigorously opposed the suggestion that he work for an embargo to Canada on anthracite coal, stating that infinite harm in the form of a pulpwood embargo might result.

The Caledonia Mills of Boston have been incorporated under Massachusetts state laws. They will do a general business in pulpwood in the Maritime provinces of Canada. Michael A. O'Leary and John M. Kendricksen of Brookline and Thomas F. Brennan of Cambridge are the incorporators.

Tileston & Hollingsworth Company are spending upwards of $200,000 on new plant and equipment at their paper mill in Mattapan, Boston. They are building a new finishing room and a new office building. Their paper machine recently completed by Rice Barton & Fales of Worcester is in process of being installed and should be operating by September 15.

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This will increase the capacity of the mill by 15 to 25 tons of English finish and machine finish book paper daily. The mill has two other fourdriniers. The new machine was viewed by many mill men for in perfection of detail and mechanical improvements it is considered the most modern book paper machine yet made.

The Burnside Tissue Mills, which were sold at public auction last month at Hartford, Conn., made an unfortunate showing in the sale insofar as its creditors are concerned. The total amount realized by the trustee, William E. Egan, from the sale of the plant and of personal property was $82,752. The purchaser was Thomas F. Garvan, who had owned the plant three years ago, and who held a first mortgage of $78,000. There was a second mortgage of $16,200, barely a fifth of which was covered in the purchase price, leaving other creditors nothing. Mr. Garvan is a paper stock packer and will continue to operate the plant according to report.

Foresters from all over the United States met for a three day session of the New England Foresters' Association at Grant Farm of the Great Northern Paper Company in the northern Maine woods. Grant Farm is one of the supply stations of the Great Northern Paper Co., in Aroostook county. The foresters made a tour of inspection of the fire warden's camps and had demonstrated to them the methods of combatting forest fires. The famous Ripogenus dam of the paper company was inspected and the parts of timber damaged by the Spruce bod worm inspected. The discussion of forestry problems was informal.

Arthur D. Little, recognized as one of the country's chief experimental chemists, conductor of an experimental paper mill in Cambridge, Mass., and past president of the American Chemical Society, declared recently regarding the papermaking opportunities in the south: "The permanence of a paper industry in the south when once established can be ensured by reforestation with rapidly growing trees like the lobelly pine and even more securely in the gulf states by plantings of bamboo, which is incomparably more productive than any wood and which yields a fiber ideal for papermaking."

Pulpwood owners on the Pacific coast have approached Boston bankers with a view to ascertain whether New England paper mills located reasonably near tidewater could become permanent customers for Pacific coast pulpwood. Several mills have also had the idea broached to them. It remains to see what prices can be offered to compete with New England's steadily rising pulpwood costs and whether the Intercoastal steamship lines will establish reasonable rates.

The new management of the American Writing Paper Company did not realize until recently that contained in their chemical laboratory were seven large cases of gun cotton used by the old management some years ago for experimental purposes. Deeming it expedient to dispose of the explosive in the quickest possible manner it was spread on rocks in the river and lighted.

Paper machines 1, 4 and 5 of the huge plant of the International Paper Company at Livermore Falls, Me., have been closed for more than a week owing to low water and scarcity of pulpwood. General Manager W. A. Murray declares that unless heavy rains come soon the plant must close indefinitely. This is the largest of all the company's mills.

The Elam Strong Paper Company of Middletown, Conn., is to close its plant in that place indefinitely, according to A. S. Elam, treasurer, who has had charge of the plant. This company took over the business of C. L. Strong & Sons, paper makers, about three years ago. It operates a factory in the middle west at Marion, Ill.

The Bird Machine Company, of East Walpole, Mass., has awarded the contract for foundations for a one story, 80 by 140 foot machine shop to be erected in South Walpole. The Lockwood Green Company of Boston are the engineers. The Bird Machine Company is a well known maker of paper mill equipment.

James Richard Carter, one of the best known men of the American paper industry, both among merchants and manufacturers, is perilously ill at his summer home in Jefferson, N. H. A shock brought on by several causes, not the least of which was the death of his wife last January, has steadily worn him down and the doctors hold out slight hope of his

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FOURDRINIER TISSUE MACHINE—One 68".
FOURDRINIER PARTS—Pusey & Jones with new Century shake, takes wire 112"x60', takes wire 100x55', 96" Kutter Trowbridge.
PRESS PARTS FOR PAPER MACHINE—Pusey & Jones bell crank housings. Two sets of press rolls 18x110 and 20x88.
DRYERS—Two 48x111. 14 Dryers 36x86. 9 Dryers 36x80. 11 Dryers 42x66. 2 Dryers 36x62.
CHILLED CALENDERS—One 104" five roll. One 66" five roll. One 58" five roll.
SLITTER AND WINDERS—One 120" Warren. One 104" Kidder. One 90" Pusey & Jones single drum. One 40" Kidder. Two 48" core cutting machines.
BEATERS—Three 72"x42" Noble & Wood. One Holyoke 54"x60". One Dilts 62"x50" iron tub. One Downingtown 52"x42" iron tub. Six Horne 36"x36". Two No. 2 Claflins.
JORDANS—One Jones Imperial. Two Monarch. One 49" Horne. One 49" Emerson. One Appleton Wagg Majestic. Three Pope brushing engines.
SCREENS—Two 12 plate open side packers. One 12 plate open side new Success. One 12 plate open side Harmon. Two 10 plate. Three White auxiliary screens. One single cylinder Wandel.
STUFF PUMPS—Two Pusey & Jones duplex 8"x10". Two 6" Pusey & Jones single plunger. Twelve 5" Post stuff pumps.
REVOLVING SHEET CUTTERS—One 84" Moore & White. One 82" Clark. Three 60" Hamblet. Four 60" Finlays. One 50" Hamblet Diagonal. One 48" and 45" Finlay.
REAM CUTTER—One 56" Smith & Winchester undercut. One 48" and one 45" Cranston undercut. One 45" Seybold.
SUPER-CALENDERS—One 52" Holyoke. One 50" Holyoke. One 48" Holyoke. One 40" and 45" Pusey & Jones.
WET MACHINES—Two 72" Bagley & Sewall hydraulic. One 48" Horne.
One Manistee Hog Chipper. Three Daniels' rag cutters. Fire pump, Deane, 14x7½x12.
Equipment for pulping waste papers, consisting of Jones Shredder, Stevens digester, duster.
We have a large number of pumps and over five hundred calender, press and couch rolls in stock.

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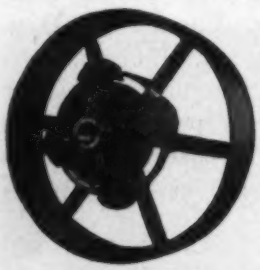

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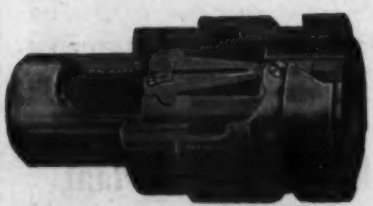

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THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

recovery. He is treasurer and general manager of the Carter Rice & Co. Corp., treasurer of Carter's Ink Company, and chief owner of the Nashua Gummed and Coated Paper Company, manufacturers, of Nashua, N. H.

The stock and equipment of the Holyoke Gummed Products Company has been transferred from the Rackliffe Building in Holyoke to their new building in South Hadley, Mass. The company specializes in gummed papers, tape and other specialties.

Huge rafts of pulp wood have been made by men living along the beaches of the Kennebec and Androscoggin Rivers in Maine. Hundreds of cords of this wood were washed down the rivers during the summer floods.

The fifty-sixth anniversary of his connection with the S. D. Warren Company was recently celebrated by Archelus H. Batchelder. He is head of the supply department in the machine division.

President Willson of the American Writing Paper Company has frankly stated that his company is in search of new capital, but he has not yet been able to devise satisfactory means of raising it.

The buildings of the Davis Paper Company, paper board makers at West Hopkinton, N. H., recently destroyed by fire, are almost completely rebuilt.

The Parsons Paper Company at Holyoke has not been seriously affected by the strike and latest reports indicate that the mill is running full time.

The Maine Central Railroad is considering an increase in freight rates on pulpwood. The road's officials declare these rates have long been too low.

Work is under way on a new 4-story addition for the C. H. Dexter & Sons paper mill at Windsor Locks, Conn.

Holyoke Strike Settled

All the Paper Industry are rejoicing over the settlement of the Holyoke paper mill strike, which lasted for seven weeks.

Approximately 4,000 people were expected to return to work, Tuesday, September 4. The strike has meant a loss in wages of close to $1,000,000, while the loss to the manufacturers will run into exceptional figures. The following is the statement of the manufacturers on the basis of the settlement of the strike. The conference was held at the office of President S. L. Wilson of the American Writing Paper Co.

1. Re-employment of all employes in their former positions without discrimination on either side, except that where the positions of stationary firemen have been filled, they shall be re-employed in some capacity at their former wages.
2. As soon as possible the subject of wages and overtime for firemen shall be decided between the companies and the union with Mr. Knight as umpire.

Foreign Correspondence

German Paper Situation

Since we had a very wet summer, at least during the first half, there was abundant and cheap motive power for many paper mills. Coal, on the other hand, became more scarce than ever since the loss of the valuable coal in Upper Silesia by the Poles. There is a continuous stream of coal steamers from England to the German ports, but considering the fact that at the end of July the English pound was worth 2 millions of our marks, our factories had to pay stupendous sums if they had to rely on coal. Raw materials of any kind, especially wood, also reached fantastic sums. Waste paper and rags are of course much in demand and are considered very valuable articles. These are saved and economized to an extent, from which other countries, especially the U. S. could learn much in order to save their diminishing national forests.

Whenever the housewife buys groceries, meat, fish, bread, and what not, she must bring along wrapping paper or she will be charged extra for wrapping paper. A single paper

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FOR EVERY PURPOSE

This will give you an idea of the wide range of sizes and styles of Cast Iron Pulleys that is constantly flowing through our shops.

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SAVES expense of Couch Jackets.

SAVES Wire Cost through reducing Flat Box friction.

PREVENTS frequent breaks.

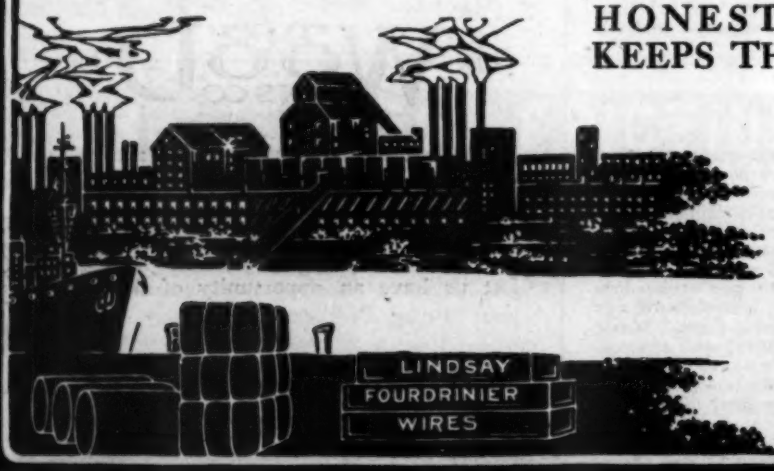
It can be adapted to any machine!

DOMINION ENGINEERING WORKS LIMITED
MONTREAL CANADA

Real Merit Placed

Lindsay Fourdrinier Wires

In Many Mills



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They are ready to serve you

The Lindsay Wire Weaving Company

Collinwood Sta., Cleveland, Ohio

"Ask any Papermaker"

bag for a pound of sugar, etc., costs about 50 marks, which amount was worth twelve dollars in 1914. During the spring the situation was unfavorable, but with the unprecedented drop of the mark in June the export business revived and the mills which had partly closed opened again. The situation is especially bad in the Ruhr and Rhine zones on account of the manufacturers not being able to obtain coal and raw materials.

After having finished this article, I received today's daily paper in which an article printed wholly in heavy type with the heading "87 Millions for a Wagon Paper." It was only a few months ago that I saw a similar article entitled "One Million Marks for a Wagon Paper," and at that time the readers shuddered. What is a million now? The poorest man is a millionaire as long as he has one suit and a pair of boots. The Imperial ministry for Economics has fixed a maximum price of 76 million marks for ten thousand kilograms, for July, but when half the month was over this calculation was upset by the stormy price development, thus the Minister increased the price to 87 millions as a consequence of higher expenses for coal and wages. The new price was made public 5 days before the end of July and from August even this monster price could not be maintained. Very likely when this news reaches you, the 100 million mark will have been surpassed.

The paper mills were not satisfied with the official price and started a delivery strike in the middle of July and no paper at all for newspapers was supplied. At the last, with the July addition, and the again raised August price, their attitude changed. Although the publishers are now supplied with paper, its enormous price forces them to increase the subscription and price of single copies. As a consequence many hundred of readers cease to buy the papers, and when the circulation drops below about 1,000 it does not pay to continue such a newspaper or journal, and either an amalgamation with another takes place or it is discontinued.

When an earthquake shakes a whole city or when a fearful storm smashes a number of trees, an idea of what the periodical market in Germany is like, can be obtained, where since a few years thousands of publications have ceased and where there is seldom a day without the funeral of one. Among them are papers that have existed for more than 50 years.

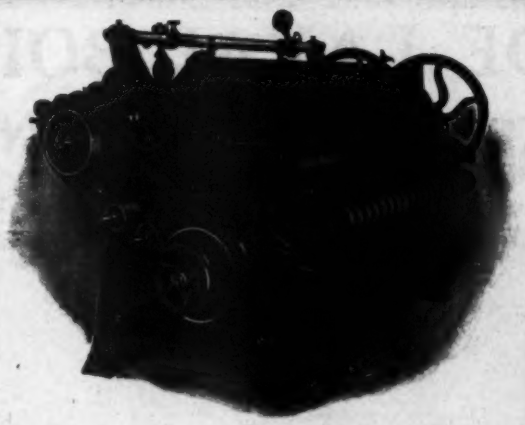
Austrian Paper Industry and Trade

The Austrian Ministry for Trade and Professions has recently issued statistics concerning the various industries, covering the past two years. All branches of the paper industry show an increased production in 1922 as compared with 1921, yet the figures of 1913 have not been reached. They make up about 80 to 95 per cent for the various grades of paper but only 59 per cent for cardboard. In 1921 one tenth to one third of the home production was exported. In 1922 the percentage was one fourth more than the year before. Their best customers were, in the order of quantity purchased, Hungary, Italy, Poland and Germany. Two years ago 170 factories, employing 17,000 hands, were running.

During this year business has improved—even the home trade. But as the money in Poland and Hungary has decreased so much in value, they have ceased to import any more paper from Austria. The export to the west has improved, and while formerly only printing and wrapping paper was ordered, better grades are now demanded. The Austrian paper marked is much influenced by the situation of the foreign markets, the worse the latter are, the better it is for Austria. In Czechoslovakia the situation is still unsatisfactory, especially to the wholesalers. The improving of the money has done much harm. In the meantime, the German mark which since the end of the war was about ten times the value of the crown has dropped much below the latter. This also applies to the Polish and Hungarian currency. With these three countries Austria does not do much business.

Immediately after the Leipzig Fair there will be a paper exhibition in Vienna, as usual, at the occasion of the General International Exposition. This will afford an excellent opportunity to see samples of all kinds of paper and finished articles, among them being the Vienna specialties, such as luxury writing paper, paper napkins, sheets for cakes and tarts, cigarette booklets or holders, sanitary paper strips for the kitchen, etc., things which have won their reputation all over the world for decades. In spite of the very grave times, the Vienna paper industry is turning out products of excellent taste.

Endeavors are being made to develop papermaking in Roumania to supply the home markets and those of Bulgaria and Turkey. There are 12 plants for manufacture of cellulose, paper and millboard. An abundance of wood and water exists, but foreign capital is needed, as also technical skill and enterprise.



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Highest Quality—Finest Steel—More Production

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ARE EFFICIENT AND RELIABLE

THIS De Laval turbine driven centrifugal boiler feed pump supplies 600 gal. per min. at 300 lbs. gage to the boilers in one of the largest automobile manufacturing plants at Detroit. The complete unit was designed, built, tested and sold by a single organization, which assumes entire and undivided responsibility for the fulfillment of guarantees concerning efficiency, capacity and other characteristics. All parts of the unit are interchangeable, being built to limit gages, and parts subject to wear, such as labyrinth wearing rings, shaft sleeves, bearings and turbine buckets can at any time be easily and quickly replaced by renewals which we supply. Ask for Catalog N-82.

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Would You Leave Clinkers and Cinders in Your Fire Box

Condensation in your paper machines and mill heating system wastes just as much fuel. It retards circulation, cools the steam and prevents heat transfusion.

A Morehead Back-to-Boiler System will correct this condition. It will keep your steam lines clear and dry, thus enabling every pound of steam to do its maximum work. It will drain condensation as it forms and return it to the boilers without pumps—at temperatures high as 360 degrees.

Production will rise, costs will drop, and the increased efficiency of your entire steam system will pay for the cost of the equipment many times over. Write for details of what we have done for others.

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"BACK-TO-BOILER-SYSTEM"
POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

Western Quebec Paper Mills Limited

The Western Quebec Paper Mills Limited of St. Andrews East, are building a modern paper mill, with modern equipment for the manufacture of high-grade light-weight paper specialties. The mill is located at St. Andrews East, Quebec, on the North River, near its junction with the Ottawa.

One of the interesting features connected with the construction of this mill, is that it is being built on the same site on which the first paper mill in the Dominion of Canada was constructed. This mill was built in 1803 and made paper for one of the leading publications of the city of Montreal.

Due to the quality of the water of the North River and the modern equipment which the Western Quebec Paper Mills Limited is installing, with every modern device for the manufacture of high grades of paper, it will be one of the finest mills of its kind on the continent.

The parties interested in the proposition are Mr. R. W. Barclay as President, Mr. C. deWolf Reid as Managing Director, and Mr. Wm. Currie as Vice-President. Mr. John Corcoran, Engineer is supervising the equipment of this plant. As these men are all acquainted with the paper industry the mill has assurance of success.

The mill has excellent shipping facilities, both by water and by rail, and its location is such that it is not only picturesque, but is historically interesting as well.

Paterson Parchment Paper Co. to Build New Mill

The erection of a new paper mill is being promoted by the Paterson Parchment Paper Company of Passaic, N. J. It is to cost $2,000,000 and will be located on the Delaware river, near Philadelphia. The company's parchment and printing plant is located at Passaic, N. J.

The plans for the new mill provide for two machines, with sufficient power capacity to add two more at a later date. The initial output will be 26 tons of paper daily. Plans have been completed and the construction program is to begin at once. It is hoped to have the new mill ready for operation by March, 1924.

The Bogalusa Paper Company, Inc., of Bogalusa, La., are installing three 1,000 H.P. Casey and Hedges boilers in their paper mill. Their pulp mill is being enlarged by installing one additional unit in the Recovery Room. They are also building a Kraft Paper Mill in which they will install one 144" trim Black-Clawson Fourdrinier Machine equipped with a Harland Electric drive. Mr. James L. Carey of Chicago, Ill., is their engineer, and Mr. Hampton Reynolds of New Orleans, La., is the contractor for the construction work.

Missiquoi Pulp Adds Extension

The Missiquoi Pulp & Paper Company of Sheldon Springs, Vt., have started construction of an extension to their plant which will cost approximately a half million dollars.

Along with the new paper mill unit there will be constructed a new power house, a large concrete chimney and a few smaller developments. This company is one of the largest bristol board manufacturers in the U. S.

The world's record for a single day's production of newsprint paper is claimed by the Belgo Canadian Paper Co., Ltd., of Shawinigan Falls, Quebec. The crew of their No. 5 machine reached the mark of 96.11 tons last July and they claim that they will soon push this up to at least 100 tons.

In their yearly report of earnings, issued to stockholders, the United Paperboard Company, Inc., of 171 Madison Ave., New York City, shows the mill earnings for the year ending May 26, 1923, to be $881,714.26 and net earnings of $646,275.02.

The MacSimBar Paper mills of Otsego, Mich., and the Allied Paper mills of Otsego and Kalamazoo have contracted with the Chapman and Stroble Detective agency of Kalamazoo for protection for the concerns and employees alike.

The Specialty Paper Mills of Camden East, Ont., Can., manufacturers of book and special papers, have been reorganized and are now under the head of the Lennox Paper Mills, Limited.

The Arrowhead Mills, Inc., with plants in Fulton, N. Y., have moved their New York City offices from 489 Fifth avenue to the new Pershing Square Building at 100 East Thirty-second street.

Davis Pressure Regulator

Economy in the Delivery of Steam

In many paper plants a large part of the coal burned is making non-productive steam—not applied to the plant load. It is being diverted from the prime movers and used in wasteful quantities to operate auxiliary apparatus.

The Davis Regulator cuts down the amount of steam consumed by this equipment. It reduces the high pressure steam needed to operate the prime movers to any desired lower pressure at which steam pumps, fan engines, and other auxiliary steam-consuming equipment operate efficiently and economically. It allows the steam that was being wasted in the operation of this equipment at excess pressures to be applied to the plant load; in other words, it changes non-productive steam to productive steam.

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STEAM SAVERS SINCE 1878

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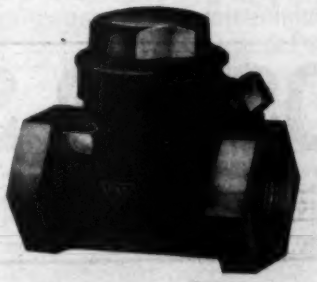

Fig. 291 Bronze Swing Check Valve

The disc can be renewed or reground with the valve in the line

Each Pratt & Cady bronze and iron valve has its own renewable feature which assures a long life in service and keeps maintenance costs low. They are built for all water and steam and oil services where the temperatures do not exceed 500° F.

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Submit your pumping problems to us for advice

Fig. 604 illustrates Taber L-O 1½x1" motor driven centrifugal pump.

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"Pump Specialists"
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Automatic Steam Regulator
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Paper Making Machines

Which absolutely control the drying of the sheet. Installed on sixty days' trial

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MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control
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When the pins and bushings in Union Steel Chains are considerably worn on the one side they can be turned half a revolution, thus bringing their unworn sides into service and practically renewing the chain; later they can be replaced with new wearing parts at small expense. Union Steel Chains invariably give longer service per dollar of cost; that's why they are used by the leaders in all industries.

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THE UNION CHAIN & MANUFACTURING COMPANY SANDUSKY, OHIO, U. S. A.
Registered UNION Trade Mark

Personal

Alfred J. Moran Starts Own Business

Alfred J. Moran, for a number of years manager of the Paper Mills' Supplies Department of the E. B. Thomas & Co., Inc., has advised the trade that the latter concern has ceased operations and that he is entering the field for his own account as A. J. Moran & Co., Inc., and will be located at 100 Hudson St., New York, N. Y., with telephone numbers Walker 5426-5427.

Mr. Moran is very well thought of by mill men as well as by packers and dealers with whom he comes in contact continuously, and a successful career is prophesied for him.

In addition to being president of the Waste Merchants Association of New York, which office he has held for three years, Mr. Moran is director of the National Association of Waste Material Dealers, Inc., having been chairman of the Waste Paper Division of that Association for a full term.

R. S. Kellogg, secretary of the News Print Service Bureau with headquarters in New York City, recently returned from an extensive trip through the paper mills of the United States and Canada. Mr. Kellogg visited Newfoundland, among other places, and studied the $25,000,000 development which the British Government is backing at Corner Brook and where 2,000 men are working on the new mill being erected there which is expected to be ready for operation in 1925. Mr. Kellogg also visited the Anglo-Newfoundland Development Company, which supplies paper for the Northcliffe publications.

A. G. Caldwell, for a number of years with the Orr Felt and Blanket Company, has joined the sales force of the recently organized Becker Woodpulp Company of America, Inc., of 501 Fifth avenue, New York. Mr. Caldwell will cover the eastern part of the country as sales representative for the company. Hal E. Stratton is in charge of sales in the Kalamazoo district with offices at the Park-American Hotel in Kalamazoo. Frank E. Dunaway, who has been prominently identified with the wood pulp trade for a good many years, is sales manager of the new company.

Thomas W. Ross, of the Hummell & Ross Fibre Corporation, and former president of the U. S. Pulp Producers' Association, sailed for Europe from New York on August 18, accompanied by Mrs. Ross and their son. Mr. Ross will land in Germany but will go immediately to Sweden and Norway where he will devote some time to studying pulp conditions. He plans to spend the winter in Southern France and to return home next spring.

William Wacht, president of the Waste Material Trading Corporation, dealers in and importers of papermakers' supplies of 135 Broadway, New York, returned from a business trip to Europe on August 18.

The Whiting-Plover Paper Company of Stevens Point, Wis., has recently secured the services of Dr. Theobald Bentzen, a noted European scientist, as chief of their laboratory and research departments.

Obituary

John C. Temple

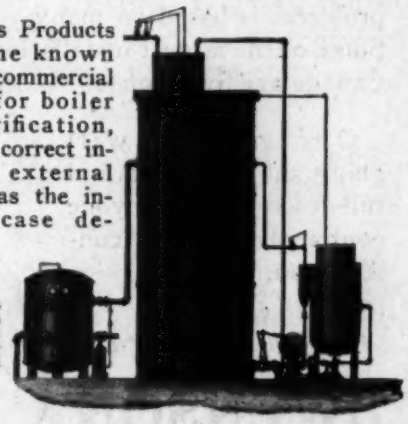
John C. Temple, hydraulic engineer and manager of the Chicago office of S. Morgan Smith Company, of York, Pa., died very suddenly Wednesday, August 8th, at the Black Hawk Hotel, Davenport, Iowa.

Mr. Temple was born April 27th, 1858, in Dayton, Ohio, and at an early age became interested in the hydraulic turbine industry, his father being one of the original members of the firm of Stout, Mills & Temple, at Dayton, who were among the pioneer water wheel builders of this country. His entire business career was devoted to water power engineering and the manufacture and sale of hydraulic turbines and accessories; he was a recognized authority on matters pertaining to hydraulic power development due to his many years experience in the engineering profession in Philadelphia, New York City and Montreal, and the exploration of undeveloped water power possibilities in Mexico and Central America, followed by his twenty odd years of service with S. Morgan Smith Company, the past fifteen years of which he was manager of their Chicago office, which position he held at the time of his death.

Mr. Temple was a 32nd degree Mason, and the funeral services which were held at Dayton, Ohio, Saturday afternoon, August 11th, were under Masonic auspices.

Water Softening and Filtration

Paige-Jones Products include the known successful commercial methods for boiler water purification, permitting correct internal or external treatment as the individual case demands.



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Swenson Reclaiming Machinery

FOR SODA AND SULPHATE MILLS

Our service to pulp and paper mills on their recovery problems is based on many years' successful experience. Some of the largest installations in the United States and Canada are Swenson's.

Our engineers will gladly submit layouts and full description to anyone contemplating new construction.

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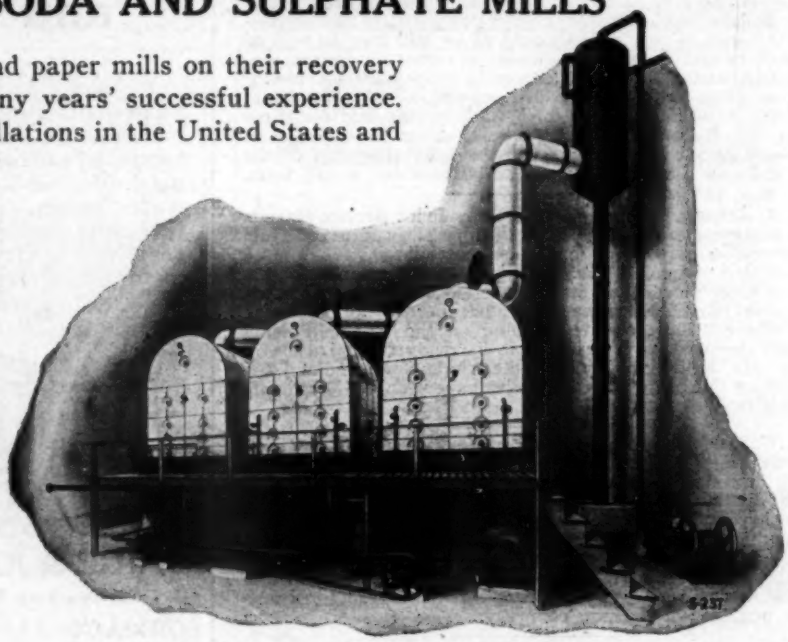

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Steel Lift Truck Platform

"Hallowell" Steel Lift Truck Platforms represent an attractive low ultimate cost

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they not only last indefinitely but also serve to practically eliminate repairs, an everlasting and expensive necessity with the all wooden construction.

The "Hallowell" is used extensively, many of the largest and most representative concerns in their lines being among those who have adopted it as their standard.

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Litharge-Glycerine Cement

A cement valuable for a number of purposes for which ordinary cement would be neither practical nor desirable is that known as litharge-glycerine cement. Its chief use is in paper mills. It is produced by adding to a mixture of five parts of ninty-five per cent pure glycerine and three parts water sufficient litharge (PbO) to form a paste of any desired consistency.

The resultant cement forms a chemical compound which when it sets becomes of incredible hardness. It hardens rapidly, remaining soft for only about ten minutes. The addition of ten per cent inert matter such as silica, Fuller's earth and iron oxide will delay the setting time considerably and also prevent cracking to a certain extent. These materials have no effect on the cement's final set and strength.

Litharge-glycerine cement will withstand a high degree of combined heat and moisture. Its most conspicuous feature, however, is its resistance to practically all acids, provided they are not of full strength. The acid-resisting properties of litharge-glycerine cement make it valuable for lining the digesters or sulphite liquor tanks, both for cementing the bricks or tile and for the facing or lining.

New Paper Barrel Machine

The paper-barrel machine is one of the newest additions to the paper industry. The machine consists of a cylinder in two parts, which can be separated to produce barrels of different shapes and two halves are rotated together on a horizontal axis.

Tough chip board paper from a roll, passing through tension rollers and an adhesive coating device, is wound tightly on the cylinder in a pre-determined number of layers. The depth of the barrel is adjusted by the separation of the cylinder halves. When the required thickness has been laid on, a slitting wheel divides the paper into two equal portions, which are drawn apart, and the middle receives an additional winding to form the bilge. It is stated that the usual form can be produced at the rate of a barrel a minute. Silicate of soda, which sets so quickly that the barrels are ready for immediate use, is the usual adhesive. For liquids a special neutral coating is applied inside to prevent corrosion. Wooden heads are commonly provided.

Though made of paper, the barrel is light, strong and durable, and can be made rapidly in a great variety of shapes.

Wax Paper Plant Ordered Sold

The Union Wax & Parchment Paper Company of Hamburg, N. J., was ordered to be sold August 30 by the Federal court. C. N. McNair of Paterson, N. J., was appointed receiver last February. According to the report of the receiver attached to the application, the plant, which has been in continuous operation since his appointment, working three shifts of eight hours each daily, has shown a profit of $82,000 in addition to improvements costing $75,000.

Included in the assets of the plant, in addition to the buildings themselves are several acres of ground, appraised at $800,000 and fifty-nine houses occupied by employees; accounts receivable of $150,000; machinery and personal property valued at $350,000 and water rights in two townships. The liabilities include bonds totaling $385,000, which are held as secured debts, and unsecured debts of $1,018,000.

As a result of a special process in manufacturing writing paper, a German manufacturer has developed a large trade in Mexico. The Mexican customs admit white paper with not more than 40 per cent ground wood under a duty of 23 centavos per kilo, while paper containing 40 to 70 per cent or more of ground wood pays 12 and 5 centavos, respectively. This manufacturer has produced a sheet having a large ground wood content by a process of bleaching and sizing. On account of the low cost at which it can be imported it is popular in the Mexican markets.

The Bureau of the Census of The Department of Commerce, Washington, D. C., has recently issued a small pamphlet entitled "The Census of Manufactures 1921—Paper and Wood Pulp." This report is one of the series presenting the results of the first biennial census of manufactures of paper and wood pulp, covering the operations of manufacturing establishments during the year 1921.

Five million new trees will be set out this year by the Laurentide Pulp and Paper Company. The young trees are grown in their own nurseries. They will thus guard against the future shortage of raw material by planting this number of trees every year.

BACK TO NORMALCY

Owing to substantial reductions in the cost of all materials entering into the construction of Jenssen Acid Towers, we are now building them at

NORMAL PRICES

Will YOU let us show YOU how to make MONEY by making a

BETTER ACID

Don't forget that every second sulphite mill on this continent is using our towers, so ask your neighbor what HE thinks of them.

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RECENTLY ISSUED
Technical Association Papers, Series VI (1923)
In paper, 208 pages, $3

A Theoretical Discussion of the Reactions of Papermaking: Jessie E. Minor.

Anti-Friction Bearings: G. H. Spencer.

Bibliography of Papermaking for 1922: C. J. West and A. Papineau-Couture.

Chemistry of the Alkaline Wood Pulp Processes: S. D. Wells and others.

Chemistry of the Sulphite Process: R. N. Miller and W. H. Swanson.

Discussion of papers.

Drying and Conditioning of Coated Paper: J. O. Ross.

Effect of Atmospheric Humidity on Paper Tests: P. L. Houston and H. S. Kirkwood.

Efficiency of Paper Drying: S. B. Jones and W. F. Goldsmith.

Evaporation of Spent Liquors: G. K. Spence.

Lake Color Manufacture: H. H. Holden.

Methods of Establishing Wage Rates and Determining Promotions: H. P. Carruth.

Papers on various subjects.

Paper testing; several papers.

Reports of committees.

Steam Economy in Pulp and Paper Mills: E. P. Gleason.

Steam Flowmeters on Sulphite Digesters: W. H. Kraske.

Study of Papermaking Materials: A. B. Green.

Use of White Water in Mechanical Pulp Mills: W. E. Brawn.

Ventilation of Machine Rooms: J. O. Ross.

Waste in the Industry: R. B. Wolf and G. D. Bearce.
White Water Losses and Their Correction.
Utilization of Barking Drum Waste.
Reduction of Broke Losses.

Technical Association of the Pulp and Paper Industry
18 East Forty-first Street New York, N. Y.

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Secretary-Treasurer, Thos. J. Burke, C. A.

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COST SYSTEMS
COMMON SENSE
THEY GO HAND IN HAND

Join this Association and help put your industry on a sound, economic basis by promoting the use of proper cost estimating and cost finding methods.

"Supported by Manufacturers from Maine to California"

Salvation Army Monopolizing Waste Paper

New York's Waste Paper Dealers' Association, unable to compete with the Salvation Army on prices, have petitioned the attorney general to take a hand. They claim that the Salvation Army, by conducting a big waste paper business, is violating the provisions of the act under which it was created as a religious and charitable corporation.

For instance in one case the Army bid $1.37 per 100 pounds for old paper, while the next highest bid by a commercial competitor, was only 65 cents per 100 pounds.

The collection of waste paper in New York City alone is a 15 million dollar industry.

The Salvation Army collects 55 thousand tons of waste paper throughout the U. S., according to their report for the last fiscal year. This represents an approximate saving of 9 thousand acres of standing timber. The money received for this old paper is used for the maintenance and extension of the Social service branch of Salvation Army work.

Transparent Paper Now Being Sold

After 50 years of experimenting in an effort to produce a paper that would be absolutely transparent, science has evolved a paper that is transparent, without taste, odor, or greasiness. Chemists have tried numerous processes in an efforts to achieve this result, notable among these processes being the use of fats, oils, resins, gums and other similar compounds. Transparent paper is much in demand among bakers and candy manufacturers, but the difficulty with nearly all so-called transparent kinds was the greasiness brought by the fats or oils used in its manufacture.

The new product is sold in various grades of hardness, thickness and other physical grades. According to Science and Invention, the paper is made as thin as ordinary tissue paper (.00½), and is not so readily combustible as celluloid. The heaviest grades are absolutely non-inflammable.—The Printing Craftsman.

Alaska Wants Paper Mills

"Alaska's greatest hope as seen by the inhabitants themselves is the establishment of a chain of paper mills," declared A. G. Wishon, general manager of the San Joaquin, Cal., Light and Power Corp., who has just returned from an extensive visit to the Alaskan territory.

"This remedy for the situation in Alaska is the introduction of foreign capital because without foreign capital nothing can be developed. The same thing would be true in California, even with the great transcontinental railroads, if foreign capital suddenly stopped coming in. The Alaskan hills have a sufficient amount of wood to last for at least a century," continued Mr. Wishon.

Oregon Editors Cooperate

The Oregon State Editorial Association will purchase their newsprint stock co-operatively in the future. The association, at the annual meeting at Hood River, Oregon, July 13, 14, 15, voted for a "newsprint committee" which will make purchases at the best prices that can be obtained.

Whether they should purchase newsprint from foreign market or patronize their home dealers was a topic that was discussed at length.

The discussion resulted in the appointment of a committee to investigate the markets of newsprint in order to determine which course the association will follow in their purchasing.

Sells Alaska Paper Pulp

It is reported that one of the largest sales of pulp timber ever made, involving about 3,340,000 cords, was recently announced by the forest service, which has awarded pulp timber in the Cascade creek unit, Tongass national forest, Alaska, to Hutton, McNear & Dougherty of San Francisco.

The sale was made on the "Perpetual timber supply" plan, by which enough seed trees are left to insure reproduction, and under which, it is believed, at least 1,500,000 tons of paper can ultimately be produced annually from Alaskan pulp wood.

The award was made on the basis of 60 cents a cord for spruce, 30 cents for hemlock and 60 cents for cedar. These prices will stand until March 31, 1956. When the sale period ends, the forest service has the right to readjust the prices.

In order to compete with water transportation, a number of trans-continental railroads have filed an application with the Interstate Commerce Commission asking to be allowed to reduce rates on paper bags from Chicago to Western points to the Pacific coast from $1.30 to $1.00 per hundred pounds, according to reports received from Washington, D. C.

O. S. Dependable Cranes

Indispensable for the rapid and economical handling of materials.

Capacities, 7 to 60 Tons

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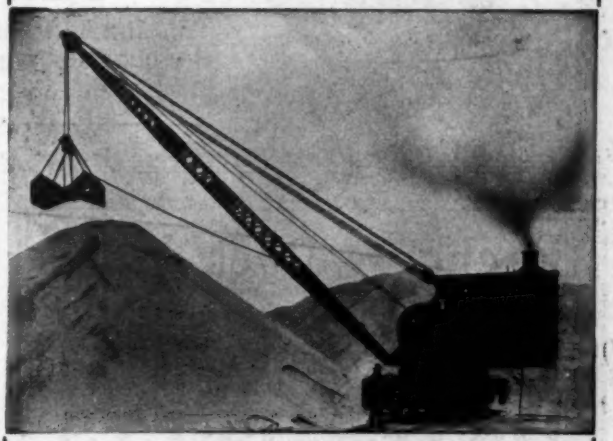


Orton & Steinbrenner Co.

Offices CHICAGO, ILL. Shops HUNTINGTON, IND.

Branch Offices in all Principal Cities

The Howard Pulp Refiner

MAKES your pulp of better quality. The action of the Howard Refiner is to brush out any fibrous material to pulp with a minimum of injury to the fibre.

The quality of pulp produced will be found much better than the pulp as generally reduced. This improved quality means a higher net value per ton.

The Howard Refiner is a time tried machine. It is in use in many paper mills in the United States, Canada and other countries and is giving excellent results

Detailed information will be gladly furnished on request.

Manitowoc Engineering Works

Manitowoc, Wisconsin

THE WATERBURY FELT CO.

SKANEATELES FALLS

New York

FELTS and JACKETS

Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

They Satisfy

Fitchburg Duck Mills

ESTABLISHED 1844

FITCHBURG, MASS.

MANUFACTURERS OF

STANDARD AND MULTIPLE PLY

DRYER FELTS

English Weave in Two, Three, Four, Five and Six Ply—60 Inches to 176 Inches in Width

Fine Faced Felts for Fine Papers. Absolutely no felt marks in paper. TRIBUNE Three Ply Felts for Coarse Papers.

The "Hamilton" Felt

Our Cylinder Wet Felts for 9 points straw and for roofing are *open* in texture, *do not* stretch and *are durable*. A trial is invited.

SHULER & BENNINGHOFEN

HAMILTON, OHIO

LOCKPORT Felts

EXCLUSIVE MAKERS OF

Paper Makers' Felts

Have You Run Them?
If Not, Why Not?

Are You Interested in Accurate Running Felts?

Give Us a Trial
Get Authentic Information
Ask the Men Who Run Them

Yours for service

LOCKPORT FELT CO., Newfane, N. Y.

DENSIMETER—A New Instrument for Paper Mills

A shop instrument for determining the density of rubber in accordance with a standard scale. Can be used in conjunction with a plastometer as its reading multiplied by two will give the plastometer reading. This is a rugged scientific instrument designed for use in the mill as well as the laboratory, and although it was primarily designed for testing rubber rolls, it may be used for testing any other rubber articles. It is suitable for testing rubber rolls in place in the machine in which they are used.

Send for Bulletin No. 124

STOWE & WOODWARD CO. The Rubber Roll Makers

Newton Upper Falls, Mass., U. S. A.

Huyck & Sons Teach Employees to Save

Ben Franklin's maxims on saving money have taught many people the wisdom of laying something aside for a rainy day. As he rigidly practiced what he preached he proved his theories on saving were correct by amassing a fortune for himself.

Likewise the F. C. Huyck & Sons of Rensselaer, N. Y., preach the gospel of "Saving" to their employees at the Kenwood mills. Their method of practicing what they preach is by the installation of an "automatic teller" right next to their pay window.

The machine consists of a desk-topped steel cabinet, and only two mechanical operations are required of the depositor who may prefer to use the machine rather than to consume valuable time in making a trip to the bank. These operations consist of first placing an envelope containing the deposit, together with a special form of pass book, both bearing the name and address of the depositor, in a metal slide and then pushing down one of a series of levers marked with the sum of money he has deposited. The action of the lever registers the amount of the deposit and stamps a receipt of the same amount on the pass book. The machine can not make a mistake but if the depositor does it is rectified at the bank. There are four levers which register respectively $1.00, $2.00, $5.00 and $10.00. Opening an account simply requires the writing the name and address of the depositor and making the initial deposit.

This is a constant and pertinent suggestion to save money before there is a chance to spend all that is contained in the pay envelope. Another desirable feature of the machine is that the privacy afforded is as absolute as that of banking in person. No one but the depositor and the bank knows how much is deposited.

A bank book associates itself with prosperity and with prosperity comes happiness.

Managers can well take heed of this bit of psychology and teach their employees to save, thereby helping create a higher morale among their workers.

New Definition for Standard Newsprint

Due to the fact that this country admits the importing of standard newsprint duty free, there has been, in the past, considerable speculation as just what might be classified as "standard."

Secretary Mellon has recently issued regulations defining standard newsprint as: "paper consisting of mechanically ground wood pulp and chemical wood pulp or sulphite containing not in excess of 30 per cent of sulphite, and varying in weight not more than 10 per cent from 32 lb. to each 500 sheets 24x36 inches.

"This definition is applicable to newsprint paper without regard to the color thereof."

This new regulation is a great deal broader than the definition given by the Tariff Commission. It allows a variation of 10 per cent in weight, where the commission's definition allowed only 5 per cent, and the new rule permits standard newsprint to contain up to 30 per cent of sulphite, where the commission's finding limited sulphite to 20 per cent.

Orton & Steinbrenner Co., manufacturers of locomotive cranes, dipper shovels, and clam shell buckets, of 608 So. Dearborn St., Chicago, announce the addition of Mr. J. J. Murphy to their Chicago sales force. Mr. Murphy formerly was the Chicago representative for the Browning Engineering Company, of Cleveland, and his many friends no doubt will be interested to hear of his new connection.

The Emanuel Salomon Corporation, dealers in and importers of papermarkers' supplies of 300 Madison avenue, New York, announces that Emanuel Salomon is no longer connected with that corporation in any capacity. The corporation will continue in business as heretofore with no changes aside from the withdrawal of Mr. Salomon.

The Florandin Equipment Company, 110 W. 40th Street, New York City, has been appointed New York Sales Agents for Conco Cranes, manufactured by the H. D. Conkey & Co., of Mondeta, Ill. The Florandin Equipment Co., are also New York sales agents for the Lo-Hed Hoists, manufactured by the American Engineering Company.

The E. C. Atkins Co., Inc., of Indianapolis, Ind., manufacturers of saws, saw tools and saw specialties, announce the appointment of Mr. John P. O'Connor as manager of their branch house at 510 First Street, Seattle, Washington, effective August 1st, 1923.

Guaranteed Perfect

Draper Hollow Balanced Brass Balls

FOR STUFF PUMPS

Absolutely balanced; will not pound out of shape

Specify these when ordering new pumps.

Order these to replace worn-out balls.

We make a specialty of repairing stuff pump balls.

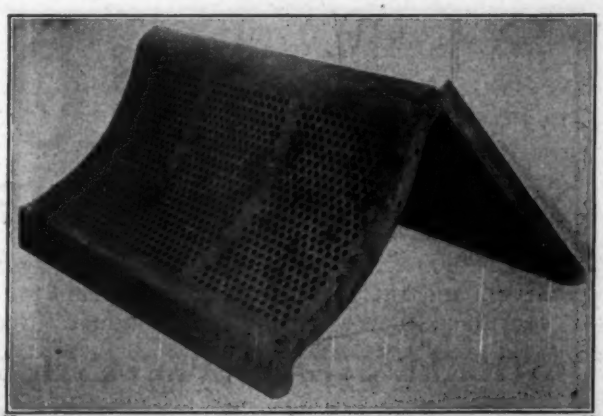
We also manufacture—

SOLID BRASS BALLS
IRON AND STEEL BALLS
BALL CHECK VALVES
VALVE FACING TOOLS

The Draper Manufacturing Co.

Port Huron, Mich. Petrolea, Canada

Every ball bears our registered trade-mark



Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

The Shartle Continuous Beater Company

MIDDLETOWN, OHIO

Diamond Automatic Valved Soot Blowers "VALV-IN-HEAD"

One of the best paying investments which the Paper Mill executive can make is to install Diamond soot blowers on his boilers. They save 4 to 8% fuel, increase boiler capacity, and decrease labor costs. Compared to what they save their cost is small.

Hundreds of boilers in the Paper Mill field are equipped with Diamond soot blowers. Among those which are using Valv-in-Head soot blowers may be mentioned

Bryant Paper Co., Kalamazoo, Mich.
Crystal Tissue Co., Middletown, Ohio.
Crown Williamette Paper Co., West Linn, Oregon.
Carthage Sulphite Pulp & Paper Co., Carthage, N. Y.
Dels Pulp & Paper Co., Eau Claire, Wis.
Falls Mfg. Co., Oconto Falls, Wis.
High Falls Pulp & Paper Co., Chateaugay, N. Y.
Itasca Paper Co., Grand Rapids, Minn.
Kimberly Clark Co., Kimberly, Wis.
Mac Sim Bar Paper Co., Otsego, Mich.
Newton Falls Paper Co., Newton Falls, N. Y.
Northwest Paper Co., Cloquet, Minn.
National Paper Products Co., Stockton, Calif.

Write for Bulletin 297

DIAMOND POWER SPECIALTY CORPORATION
DETROIT, MICH.

$1000.00
CASH FORFEIT

$1000.00 Cash forfeit that the Stickle system for removing air and Condensation from the dryers and automatic regulation of steam for drying will dry more paper evenly with less steam consumed than any equipment manufactured for the same purpose under a competitive test.

STICKLE STEAM SPECIALTIES CO. **Indianapolis, Ind.**

WE-FU-GO AND SCAIFE WATER

PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

New President for Republic Rubber Co.

With the culmination of his duties as receiver for the Republic Rubber Company, Mr. C. H. Booth has tendered his resignation as president of that company.

After a meeting of the board of directors held recently, it was announced that Mr. E. H. Fitch, former vice-president, and the man whom Mr. Booth chose for his right hand man during the receivership, had been made president of the Republic Rubber Company, to carry on the constructive policies established by Mr. Booth.

The Republic Rubber Company was recently sold to the Lee Rubber and Tire Company of Philadelphia and New York.

Takes Over New Plant

Announcement is made by Logemann Brothers Co., manufacturers of the well-known "Logemann" Baling and Scrap Metal Presses, that they have purchased the business, patents and good-will of the Chicago Baling Press Mfg. Co. of Chicago, and in addition to their regular line of hand-operated, power-driven and hydraulic balers, are now prepared to furnish the "Logemann Modern Leader" balers and repair parts formerly manufactured by the latter organization.

The business is now entirely conducted from the main offices and works of Longemann Brothers Co., at Milwaukee, Wisconsin, and through their district offices.

Water Filtration Bulletin

The Graver system of water filtration is thoroly discussed in a new bulletin published by the Graver Corporation of East Chicago, Ind.

A few paragraphs on the definition and needs of filtration are first given. This is followed by a description of the different processes of filtration used to-day. The Graver process is fully described, and why it was adopted by them. Several facsimile blue prints are shown, illustrating the system of installation, in conjunction with tables of dimensions, capacities and weights of their various types of filters. These should prove to be a distinct advantage to architects, engineers and others in designing plants and laying out new equipment.

This and other bulletins on filter installation can be obtained upon request from this company.

Industrial Works Issues New Catalog

The Industrial Works of Bay City, Mich., is now issuing a Golden Anniversary Catalog, commemorating 50 years of service to American industry and containing illustrations, engineering data and performance records of its products.

The foreword and history of cranes outlined in this catalog goes back into the times of the pyramids—5,000 years ago—illustrating and describing the different methods of hoisting, transferring and material handling up to more modern times.

Full description and illustrations are given to their products, which are rail, traction, crawling tractor, locomotive and other types of cranes, grab buckets, etc. The entire catalog is well prepared and is one of educational value.

New Book on Filtration

"Industrial Filtration" by Arthur Wright, has recently been put on the market by the Chemical Catalog Company, Inc., of 19 East 24th St., New York City.

This book is 6 inches by 9 inches, is attractively bound in cloth, and contains 336 pages. It is divided into three sections, each section being a complete treatise on the subject under discussion.

Part 1 is an exhaustive treatise on the theory of filtration. Part 2 treats on the Mechanics of Filtration and gives detailed account and description of the various old and new filter processes. Filter practice, is the heading of part 3, which describes in detail the application of different types of filters, the relation of filtration to other plant operations and plant practice.

Type AA Reliance Induction Motors for two and three phase alternating current circuits are described fully in a very attractive pamphlet published by the Reliance Electric and Engineering Company of Cleveland, O. The pamphlet contains many photographs and illustrations of this type of motor, besides giving a full description of how it is made and for what uses it can best be employed in.

The Sterling Mill Supply Company, Inc., packers of paper mill supplies of 148 Wooster street, New York, has increased its capital from $25,000 to $50,000.

Oregon Pulp & Paper Enlarges

The Oregon Pulp and Paper Company of Salem, Oregon, are planning to build a new addition to their mill next spring. This will be the third extension of their mill within a year. A few months ago a new building for a giant new paper making machine was erected. A little later new digesters to take care of the pulp wood were installed.

The plans are to prepare for quantity production of fine papers—the finest on the western side of the United States. The new addition will measure 130 by 170 feet; and it will be of the same concrete and steel construction as the present main building.

A brochure entitled "Industry Finding" has been published by the Appleton Chamber of Commerce of Appleton, Wis. It contains the address of R. R. Shuman, president of the Shuman-Hawes Advertising Company of Chicago, delivered before a joint meeting of Advertising Club, Rotary, Lions and the Appleton Chamber of Commerce, held June 19, on the advantage and possibilities of community advertising. Mr. Shuman advocated the plan of advertising the city of Appleton through the medium of trade papers associated with the industries that they desire to attract.

Exhibit Miniature Paper Making Machine

The American Writing Paper Company will have, at the Pacific Coast Graphic Arts Exposition which will be held in Oakland, Cal., in October, its famous miniature paper making machine and educational exhibit.

The complete process from raw materials to the finished product is shown in this exhibit, each step in the process of manufacture being reproduced by the miniature machine.

Elected Director of Bank

Charles W. Shartle, Sr., head of the Shartle Brothers Machine Company, of Middletown, Ohio, was recently elected director of the First and Merchants National Bank of that city.

Mr. Shartle is a business man of wide activities and is well known to the paper industry as a manufacturer of high quality paper making machinery.

WANTED Early in October—Experienced **Machine Tenders, Beatermen, Back Tenders** and **Second Hands** for new high grade tissue mill (Fourdrinier machine) in Canada. Pleasant location in small town. Married men with working families preferred. Good housing accommodation and moderate living costs. Vacancies also for **Cutterman, Calenderman** and **Finisher.** Excellent opening for first-class men. Apply, giving full particulars of experience, references and stating wage expected to Box 57. THE PAPER INDUSTRY.

CRESCENT BELT FASTENERS
They Insure Full Power Transmission
They Sustain the Belt's Full Strength
They Make Good Belts give Better Service
CRESCENT BELT FASTENER CO.

J. H. WALLACE & COMPANY.
TEMPLE COURT BUILDING
NEW YORK CITY, U.S.A.
CABLES, TRIPLEX, N.Y.

PULP PAPER AND POWER PLANTS

ENGINEERS & CHEMISTS
INDUSTRIAL DESIGN
PLANT IMPROVEMENT
LABORATORY TESTS

James L. Carey
Paper Mill Architect and Engineer
208 N. Laramie Ave., Chicago, Ill.

FERGUSON ENGINEERS
JOHN F. FERGUSON
Complete Pulp & Paper Mills, Investigation of New Enterprises, Special Heat & Power Applications, Hydro-Electric Developments, Steam-Electric Power Systems, Sectionalized Paper Machine Drives.
Analysis, Design, Construction, Operation Efficiency
1210 First National Bank Bldg.
Holyoke, Mass. CHICAGO, ILL.

H. S. TAYLOR--- CONSULTING ENGINEER
PULP, PAPER AND FIBRE MILLS
HYDRO-ELECTRIC AND STEAM POWER PLANTS, PLANS SPECIFICATIONS, EVALUATIONS, REPORTS, CONSULTATION
JEFFERSON ST. ARCADE, DAYTON, OHIO

THE
MANAGEMENT ENGINEERING AND DEVELOPMENT CO.
7TH FLOOR CITY NATIONAL BANK BLDG.,
DAYTON, OHIO.
DESIGN, CONSTRUCTION AND OPERATION
OF
PULP, PAPER AND FIBRE MILLS
WATERPOWER DEVELOPMENT
STEAM POWER PLANTS.
PLANS AND SPECIFICATIONS
EVALUATIONS AND REPORTS
··CONSULTATIONS··

B. M. BAXTER
Consulting Engineer
5716 Euclid Avenue, Cleveland, Ohio
Engineering Service for Paper Mills
Construction and Production
BOOK, BOXBOARD, BONDS AND LEDGERS, TISSUE, ROPE MANILAS AND SPECIALTIES

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Industrial Engineer
PULP AND PAPER MILLS, HYDRO-ELECTRIC AND STEAM POWER PLANTS
ELECTRIFICATION PAPER MILL PROPERTIES
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H. B. Wadsworth
Export *Domestic*
Pulp and Paper
Paper Making Machinery
Mill Supplies, Etc.
51 East 42nd Street
NEW YORK

HARDY S. FERGUSON
CONSULTING ENGINEER
200 FIFTH AVENUE NEW YORK CITY
Member Am. Soc. C. E.
Member Am. Soc. M. E.
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PAPER, PULP AND FIBRE MILLS INCLUDING BUILDINGS AND COMPLETE MECHANICAL EQUIPMENT
WATER POWER DEVELOPMENT
DAMS, STORAGE RESERVOIRS AND OTHER HYDRAULIC STRUCTURES
STEAM PLANTS
Examinations Reports Estimates of Cost Designs Specifications Valuations

New York, Aug. 1, 1923.

WITH the autumn drawing near the customary quickening of demand for the various kinds of paper is becoming manifest. There has been quite a pick up in inquiry from numerous consuming quarters in the past several weeks; printers and publishers and other large users of paper have evinced greater buying interest than in some time, and indications are that the market is gradually developing characteristics which usually are noted during the fall of the year. What is especially pleasing is that many of the inquiries emanate from important consuming sources—from concerns which are heavy users of paper, and which evince a desire to contract for large amounts of paper. The market as a whole is in a livelier condition at present than at any time since early in the year and prospects are favorable for a very busy fall and early winter.

There is no doubting that general business conditions are improved today over several months ago. Manufacturers and merchants the country over are in a more optimistic frame of mind and are more confident over the outlook. Most business men of the nation fully appreciate that the development of the usual summer lull in trade this year was the best thing that could possibly have happened for the commercial structure of the United States. Had matters kept on in the direction they had started during the first half of the year, industry would today be in the midst of a period of inflation; fortunately, however, the brakes were applied—the bankers and manufacturers of the country being aided in this operation by the customary slowing down of business in the summer—and the situation now, while somewhat quieter than prevailed in the spring, is by far healthier.

Because of this the opinion is common that good business is to be encountered during the remainder of the year. Certainly there are numerous indications of an active demand for various manufactured articles and of generally lively trading in all commodities. One concrete sign is the amount of merchandise buyers from all corners of the United States who have been in New York recently have purchased for fall and winter retailing. Reports state that a larger business has been done in all descriptions of wearing apparel in this market during the buying season just come to a close than in any season in the past. This means obviously that merchants anticipate a heavy retail demand for clothing and other merchandise over the balance of the year, and after all good business starts and ends at the retail end, because if the ultimate consumer does not buy there is no basis for commercial activity.

Industrial conditions throughout the country are favorable. Not in a long time has unemployment been so light; in fact, there is a pronounced scarcity of many classes of labor all over the land. Any man who wants work today can easily find it, and, what is more, at very attractive wages. With the masses of workmen therefore engaged and earning better pay than ever before, with the possible exception of the war boom period, it stands to reason that more money will be kept in circulation and that business will thrive.

Under these circumstances a big consumption of paper of various kinds is promised in the next few months. Paper is a commodity dependent altogether on other lines of trade, and if business generally is active there should be a large demand for paper. It is true that world conditions at present are not all that could be desired; it is equally true that the economic and financial situations in the European countries are affecting the commerce of the United States, but paper is not an export product of any great consequence in this country, and while the conditions abroad may indirectly have some deterrent influence on the paper market, they should not prevent business within the confines of our own country from assuming the proportions which it gives promise of reaching during the balance of this year.

Reports tell of paper mills gradually increasing their production to take care of the larger demands made on them for their product. The usual autumn broadening of buying interest in paper has developed earlier this year than ordinarily. Consumers evidently have unbounded faith in the stability of paper prices, and, not expecting any declines but rather looking for advances if any changes occur, have come actively into the market to secure supplies, not alone for immediate use but also against forward requirements. Paper and board manufacturers are better fixed with orders than they have been in probably three or four months; moreover, they are finding that demand is slowly but surely expanding as buyers note an increase in their own wants and increase the volume of their orders accordingly.

Newsprint output, both in the United States and in Canada, continues at the peak, allowing of course for seasonal variations, and is well ahead of that of a year ago. United States production during July amounted to 125,768 net tons, compared with 120,839 tons in the same month of 1922, while figures compiled by the Canadian Pulp and Paper Association show that Canada produced 105,716 net tons in July, against 90,282 tons in July a year ago. July figures for both countries show a seasonal falling off in production in anticipation of fall business as mills make needed repairs and take inventory during that month.

Manufacturers report resumption of orders for fall and winter delivery are about a month ahead of the usual time this year, which includes other kinds of paper besides newsprint. Print paper consumption shows no signs of diminution, and 1923 will undoubtedly be a record year. Production is keeping pace with the heavy demand, and at least for the balance of this year American and Canadian mills should operate at capacity. In fact, a great majority of manufacturers are very nearly sold up for the rest of the year, and if publishers continue to come into the market for additional supplies it is more than likely that spot supplies will be well nigh unobtainable toward the close of the year.

No one looks for any change in newsprint prices over the remainder of the year, since manufacturers have announced they will not alter quotations, and price consequently plays little part in current business in print paper. Publishers are covering their requirements well ahead and are readily meeting the quotations named, with the result a firm price tone exists. In frequent cases consumers are granting premiums to secure prompt shipments, as most mills are so well sold up they have little of their product to direct to transient buyers.

Book papers are in a firmer market position. Demand has increased perceptibly and manufacturers are fairly well provided with orders, so that there is less disposition to shade prices to induce buyers to operate. Machine finished book is quoted at 6.50 to 7 cents per pound, f.o.b. New York, for the usual run of quality of this description of paper, while coated book is quoted at from 8 cents per pound upwards at consuming points.

Fine papers are in a stronger technical position. The firemen's strike in the Holyoke writing paper plants, occasioning a shutdown of those mills for more than a month, gave manufacturers an opportunity to work off the bulk of their surplus stocks of fine papers and there is consequently less pressure to market supplies. Prices are firmer, and increased cost of production appears likely to send quotations higher.

Coarse papers are not as active as other grades, but some improvement in demand has been scored, especially for wrapping papers, which are meeting with a better call in spite of the sharp competition of imported kraft papers. Prices are steady and any changes in the near future will probably be in an upward direction.

Boxboards are enjoying a much better demand. Paper box manufacturers are preparing for their busy pre-holiday season and are absorbing boards in larger tonnage. In fact, buying has increased to a point where prices have been influenced and boards are on advanced levels, plain chip being quoted at a minimum of $60 per ton, f.o.b. consuming centers in the East, and filled newsboard at $65 a ton.

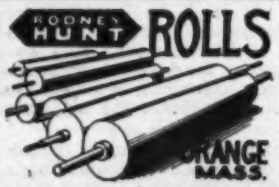
The largest individual consumer of paper in Japan is the cigarette and tobacco industry. Purchases of paper are made through the medium of certain local firms designated by the Tobacco Monopoly Bureau.

A process for the manufacture of furniture from pulp is reported to have been invented by a German architect. The product is said to be durable and less expensive than wooden furniture.

AMERICAN AND ENGLISH **CHINA CLAYS** OF THE HIGHEST QUALITY

UNITED CLAY MINES CORPORATION

TRENTON, N. J. EAST LIVERPOOL, OHIO



SERVICE AND SATISFACTION FOR PAPER MILLS

Rodney Hunt Machinery Co.
45 Maple Street, Orange, Mass.

Robins Conveying Systems

FOR HANDLING BULK MATERIALS

Write for Handbook of Conveyor Practice

ROBINS CONVEYING BELT COMPANY

New York Chicago Pittsburgh Boston

Western Paper Makers Chemical Company

Paper Makers Chemical Company

Kalamazoo, Mich. Holyoke, Mass. Easton, Pa.
Jacksonville, Fla. Pensacola, Fla. St. Austell, England

Rosin Size, Satin White, Clays, Fillers
Foam Killer, Felt Soap and Other Specialties

CASEIN

Standard Quality
Lowest Prices

The Casein Manufacturing Company

15 Park Row New York

ALKALI

QUANTITY AND QUALITY

To assure quantity production and uniform quality the raw materials of paper manufacture must be constant in supply and uniform in quality.

Diamond Tested Alkalies are produced in the most modern alkali plants in the world, where quality is the first consideration. Diamond Soda Ash and Diamond Caustic Soda, because of their uniform high quality, are particularly adapted to the requirements of paper manufacture.

The location of the Diamond plants at Painesville, Ohio, where they are directly served by three trunk line railroads, assures a constant supply of these materials.

Manufactured and Sold by

DIAMOND ALKALI COMPANY

PITTSBURGH, PENNSYLVANIA

Domestic Raw Materials

Papermaking Rags

With the autumn approaching and with paper mills increasing their operations, there has been the usual stimulation of demand for rag stock in the past several weeks. Consumers continue to purchase rags in a reserved manner, seldom, if ever, evincing interest in other than supplies directly and actually required, yet as is invariably the case at around this time of the year demand has increased in volume and the market for papermaking rags is displaying a fairly firm undertone. No board changes in prices have occurred but the tendency in most grades is upward, particularly on the high quality rags for fine paper manufacture.

Probably the feature of the market within the past several weeks has been the slowing down of demand from felt paper mills for roofing rags and the consequent sagging of prices on this class of material. The easing of roofing stock was nothing unusual, neither was it unexpected. For a period of about a month demand for these rags was brisk, felt manufacturers bought actively and readily met advanced prices, with the result market levels rose to a point where they were 50 per cent above the bottom prices prevailing early in the summer, and, as is invariably the case following such a sharp rise in roofing rags, a reaction occurred, due in large part to the retirement of important consumers as buyers. Prices since the market turned downward have slid off several dollars per ton but again show signs of firming and appear to be waiting only a revival of demand before starting on the uptrend once more.

As a general thing when roofing rags decline the higher qualities recede in price in sympathy. This has not been the case in the recent sagging of roofing stock values, however. High grades of rags hold firm and only in exceptional cases has there been any break in prices. This is taken by members of the trade to reflect the stronger technical position of the better kinds of papermaking rags. There is no serious scarcity of any grade but some descriptions are not in plentiful supply; in fact, there does not appear to be any bountiful stocks of any grade of rags. Importations during the past two or three months have dropped off to a marked degree owing, no doubt, to the prices prevailing in the market here being below those at primary sources in Europe, and the large stocks of foreign rags which were held unsold in the United States in the early summer have about been used up by paper mills. Since the advance in roofing stock a few weeks ago buying by importers on the other side of the Atlantic has increased perceptibly, and the probabilities are larger amounts will be coming into the country in the near future.

Within the past two months almost every rag importing concern of importance in New York City has sent representatives to Europe for the avowed purpose of buying up rags from French, German, Belgian, British and other European dealers for shipment to the United States in time for the usual fall season for papermaking rags. The position of the market in this country in the next several months seems to rest almost entirely on the tonnage of rags purchased by these import houses, along with others, of course, who have bought through the medium of cablegrams. The outlook is for a fairly heavy demand for rags from paper mills this fall. The fact that demand for sometime past has been mainly against actual requirements would indicate that a majority of mills have small stocks on hand, and it is therefore expected that as papermaking operations quicken during the fall and early winter buying of rags will appreciably increase. If importers have experienced difficulty in getting normal amounts of rags in Europe, as many of them aver, then it is quite likely sharp advances will occur in prices in the American market; if usual supplies can be secured from Europe there should be no material changes in prices from those now prevailing. Domestic supplies are at least a little below normal, this being a result of labor conditions the country over and a lack of the usual number of collectors to go out and gather rags, so it would seem that the future of the market depends on importations—whether or not sufficient supply is brought into the country from outside sources to make up the shortage at home and keep paper mills supplied.

There is still a moderately good movement of roofing rags into consuming channels notwithstanding that felt mills are not buying anywheres near as actively as they were a short while ago. Regular shipments are being made by numerous packers, and prices range arcund 1.50 cents per pound f.o.b. dealers' shipping points for No. 1 roofing stock in the East, and 1.40 cents for No. 2 packing, while market levels in the Middle West are a little above these prices. Foreign dark cottons are generally held by importers for 1.65 to 1.70 cents a pound ex dock New York but mills are mostly averse to meeting quite these figures, about 1.55 to 1.60 cents constituting the latter's idea of market prices.

New cuttings have been in slow demand from paper mills. The shutdown of Holyoke writing paper mills has eliminated the bulk of demand from that important quarter, and consumers in other parts of the country have purchased in a sparing way. Since the Holyoke plants have resumed, however, cuttings are enjoying more inquiry, and indications point to a large movement of such rags shortly. Dealers are holding new cuttings with firmness, especially some grades which are in small supply. No. 1 white shirt cuttings are quoted at 12.50 cents per pound f.o.b. New York, unbleached muslins at 11.25 cents, blue overall cuttings at 8 cents, light silesias at 8 cents, washables at 4.75 to 5 cents, and fancy shirt cuttings at 5.75 to 6 cents.

Old white rags are quotably steady and dealers assert that there is a pronounced shortage of good quality whites. Thirds and blues are slightly lower in some quarters, though prices generally are at about last reported levels, repacked blues being quoted at from 2.75 to 3.25 cents a pound at dealers' points, depending on the quality of packing, and rough blues at 2.25 cents.

High grades of foreign rags are firm and prices display a tendency to rise. It is stated that export embargoes in some countries of Europe are keeping many of these rags out of the United States.

Average quotations f.o.b. shipping points and ex dock are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	12.25-12.75
White shirt cuttings, No. 2	6.00- 6.25
Fancy shirt cuttings	5.75- 6.00
Washables, No. 1	4.75- 5.00
Unbleached muslins	11.25-11.50
White lawns	11.00-11.25
Overall cuttings, blue	8.00- 8.25
Black silesias	4.75- 5.00
Light flannelettes	10.00-10.25
Canton flannels, bleached	10.75-11.00
Canton flannels, unbleached	9.75-10.00
Shoe cuttings, bleached	9.50- 9.75
Shoe cuttings, unbleached	7.75- 8.00
Light silesias	8.00- 8.25
O. D. khaki cuttings	4.25- 4.50
Mixed khaki cuttings	3.75- 4.00
Corduroy cuttings	3.75- 4.00
Cottonade cuttings	3.75- 4.00
Linens, No. 1 white, foreign	14.50-15.50
Light prints, foreign	5.25- 5.50
Old Stock—	
Whites, No. 1, repacked	7.00- 8.00
Whites, No. 2, repacked	4.25- 4.75
Whites, house soiled	2.65- 2.85
Whites, street soiled	2.40- 2.60
Lace curtains	3.75- 4.00
Thirds and blues, rough	2.15- 2.40
Thirds and blues, repacked	2.75- 3.25
Black stockings	3.00- 3.25
Cotton canvas, No. 1	4.00- 4.25
White cotton batting	4.75- 5.00
Roofing, No. 1	1.50- 1.60
Roofing, No. 2	1.40- 1.50
Dark colored cottons, foreign	1.60- 1.70
Blue linens, foreign	4.00- 4.50
Grey linens, foreign	6.00- 6.50
White linens, foreign	10.00-10.50
Light prints, foreign	3.00- 3.25

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Rope and Bagging

After having passed through a rather lengthy period of dullness, the market for old rope appears to be improving in activity, consumers showing increasing interest in this commodity and the movement toward paper mills inclining to expand. Not much change has developed in prices as yet, however. No. 1 manila rope of domestic origin continues to sell at 5.50 to 5.75 cents per pound, f. o. b. dealers' shipping points, while foreign manila rope is bringing between 5.25 and 5.50 cents ex dock New York. Dealers put great stress on the shortage of old rope at producing sources, stating that nowhere near as much rope is coming in from collectors as is normally received, and it is their contention that any appreciable expansion of demand from paper manufacturers will send prices higher at once. Old strings are in good call, and also are scarce. Mixed strings are selling to consumers at 1.25 cents a pound and higher at shipping points, while bright sisal strings have sold up to 2.35 cents per pound.

Old bagging is quiet. A fair movement of roofing bagging has been noted recently at improved prices, felt mills paying around 1.10 cents a pound for straight shipments of bagging at dealers' points, but tissue paper manufacturers continue to be slow buyers and seem to be filling their wants in No. 1 scrap bagging at about 1.25 cents a pound, f. o. b. shipping points. Gunny bagging is noticeably neglected by buyers, and there isn't much activity in wool tares.

F.o.b. shipping point quotations follow:

	New York and Chicago
Gunny, No. 1 domestic	1.25-1.35
Gunny, No. 1 foreign	1.15-1.25
Scrap bagging, No. 1	1.15-1.25
Roofing bagging	1.00-1.10
Wool tares, heavy	1.50-1.65
Wool tares, light	1.40-1.50
Manila rope, No. 1 foreign	5.25-5.50
Manila rope, No. 1 domestic	5.50-5.75
Sisal strings	2.20-2.40
Mixed strings	1.25-1.50

Old Paper

Following a period during which demand for old paper resembled a near boom, the market has quieted down somewhat and prices on certain grades have receded. Low qualities have been chiefly affected. Folded newspapers which sold up to 1.30 cents per pound, f. o. b. dealers' shipping points, are down to about 1.05 cents, with reports telling of even lower prices obtaining in the East. No. 1 mixed paper is quoted at 85 to 95 cents a hundred pounds at dealers' points, representing also a considerable decline from recent high levels, while common mixed paper is selling at 50 to 60 cents a hundred pounds, and boxboard cutting at 95 cents to $1 per hundred pounds. The down trend in prices is the result of a slowing of demand from board mills, but the market is in a state where any increase in buying would likely send prices soaring again.

Shavings rule fairly steady at between 4.25 and 4.50 cents per pound for No. 1 hard white, and 3.25 to 3.50 cents for No. 1 soft white shavings at shippers' points, prices depending on the quality of packing and the tonnage involved. Flat stock has moved off a little in price. Heavy No. 1 magazines are quoted at 1.90 to 2.10 cents a pound at dealers' points, and No. 1 crumpled book at 1.65 to 1.75 cents. Old kraft paper is steady at 2.25 cents per pound, and white blank news cuttings remain at a price level of 2.10 cents a pound. Offered supplies of old paper do not appear to be quite up to normal tonnage, but consumers apparently are filling their requirements without difficulty.

F.o.b. shipping point quotations are:

	New York and Chicago
Hard white shavings, No. 1	4.25-4.50
Hard white shavings, No. 2	3.75-4.00
Soft white shavings	3.25-3.50
Colored shavings	1.90-2.00
Heavy book, No. 1	1.90-2.10
Crumpled book, No. 1	1.65-1.75
Ledger stock	2.00-2.25
Kraft, No. 1	2.25-2.35
Manilas, No. 1	1.20-1.40
White blank news	2.10-2.20
Over-issue news, No. 1	1.20-1.30
Folded news	1.00-1.10
Mill wrappers	1.00-1.10
Boxboard cuttings	.95-1.00
Mixed paper, No. 1	.85- .95
Common paper	.50- .60

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Chemical Pulp

Most of the activity in chemical wood pulp at present is against contracts which consumers placed with manufacturers some time ago providing for their major requirements over a stipulated period. Current demand is rather narrow. There is some good buying being engaged in by certain papermakers who are in need of supplies, but orders are confined almost exclusively to pulp actually and immediately required, so that the market is none too active and displays characteristics usual for the late summer. There are, however, numerous prospects of a broad market for domestic pulps developing later in the year. Should any of the predictions of a shortage of Scandinavian pulp arising during the last several months of the year come true, there is no doubt that pulp manufacturers in the United States and Canada would experience a much livelier call for their product, and many confidently expect this to develop before the year is out. There is accordingly no great pressure to sell at present. Producers are wisely gauging their output on the demand from customers and seem to have no large surplus stocks on hand. Quotations are maintained and sufficient business is transpiring to give prices a moderately steady tone.

Bleached sulphite is quoted at between 4.50 and 5 cents a pound, f.o.b. pulp mills, the high figure being named on bond grades and the low on sulphite for book paper mills. Unbleached sulphite is quoted at 3.25 to 3.50 cents for No. 1 quality at producing plants, and around 3.15 cents for news grade. Kraft pulp is firm at 3.25 to 3.50 cents at pulp mills, and one of the largest manufacturers of kraft on this continent reports he is securing 4 cents a pound delivered paper mills for all of his No. 1 pulp. Bleached soda pulp is priced at 3.75 to 4 cents a pound, a majority of producers naming the low figure but some asking and obtaining the higher price.

F.o.b. pulp mill quotations are as follows:

Bleached sulphite	4.50-5.00
Easy bleaching sulphite	3.50-3.75
Unbleached sulphite, No. 1	3.25-3.50
News grade sulphite	3.00-3.25
Soda pulp, bleached	3.75-4.00
Mitscherlich, unbleached	3.50-3.75
Kraft, No. 1	3.25-3.50
Screenings, refined	1.50-1.75

Mechanical Pulp

Probably of all the various descriptions of raw material entering into the manufacture of paper and board, ground wood is at the moment in the strongest market position. Demand for mechanical pulp is brisk, paper and board mills are actively seeking supplies, prices are advancing at a rapid clip and seem destined to reach higher levels, while a distinct shortage of pulp exists in some quarters. The strong market is due primarily to low water in mill streams and a resultant decrease in production, a good many grinders in different parts of the country having been compelled to reduce their operations because of a lack of water. In upper New York State and in Wisconsin, where many grinders are located who ordinarily have a surplus of ground wood over their own requirements to sell in the open market, demand is active, since producers in numerous instances are themselves looking for supplies for their own consumption or to cover sales commitments.

Most of the ground wood figuring in current trading is of Canadian origin and grinders across the border are reported freely securing $42 and more per ton, f.o.b. pulp mills, for spruce ground wood for prompt shipment, some sales up to $45 having been reported. Domestic ground wood is quoted at $37 to $40 a ton at shipping points, but the cost of this pulp on a delivered basis is as high as the Canadian product because of the greater amount of moisture in it and the consequent higher freight rate. Many in the trade assert that prices of ground wood will soon go to $50 a ton at pulp mills unless water conditions improve very materially in the near future.

Chemicals

There is a moderate demand for most descriptions of chemicals used by paper and pulp manufacturers. Orders are mainly for rather limited amounts, since consumers are buying practically to fill direct needs, but the movement against contracts and to transient buyers is in the aggregate of fair volume. Prices are fluctuating on a narrow scale with no important changes recorded. Casein is quoted at 15 to 16 cents per pound, with duty paid on the foreign product, and is meeting with a fair demand. Bleaching powder holds at about 1.60 cents per pound or slightly less, while caustic soda is quoted at 3.15 to 3.25 cents a pound. Brimstone is steady at $18 to $20 per long ton at the mines.

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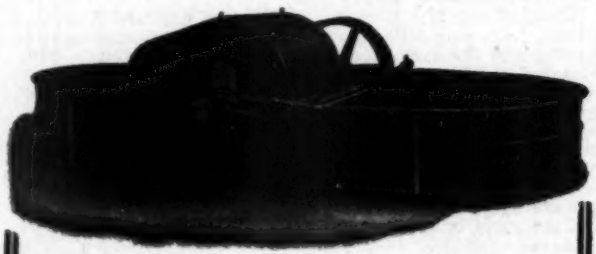

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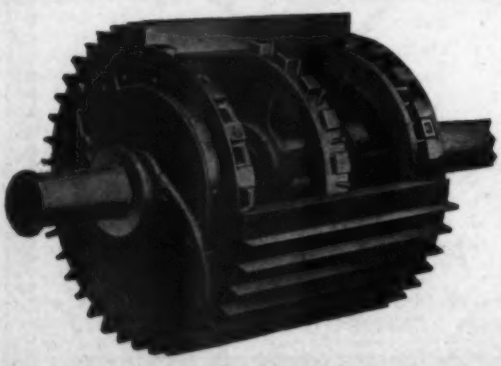

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White rag	20-45
White sulphite	12-30
Colored rag	16-40
Ledger—	
White rag	20-50
White sulphite	14-30
Colored sulphite	15-30
Colored rag	16-50
Bonds—	
White rag	19-45
White sulphite	10-30
Colored sulphite	11-30
Colored rag	18-45
Book—	
No. 1 S. & S. C	6.75- 7.50
Machine finished	6.50- 7.25
English finished	6.75- 7.50
Coated and enameled	8.00-12.00
Lithograph, M. F.	9.00-14.00
Newsprint—	
Rolls, contract	3.75- 4.00
Rolls, transient	4.00- 4.25
Sheets	4.25- 4.50
Side runs	3.25- 3.75
Cover Stock—	
Coated, both sides	10.25
Coated, one side	10.15
Tissue—	
No. 1 white, 20x30	.80- .90
No. 2 white, 24-36	.70- .80
No. 1 manila, 24-36	.70- .80
Kraft	1.00- 1.25
Wrappings—	
No. 1 Kraft	6.50- 7.25
No. 2 Kraft	6.00- 6.50
Boards—	New York and Chicago
Solid news	67.50-72.50
Straw	60.00-65.00
Plain chip	60.00-65.00
White coated chip	80.00-85.00
Manila coated chip	75.00-80.00
Binders' board	85.00-90.00

Chemicals (Continued)

Average quotations are as follows:

Alum, lump ammonia	3.25- 3.50
Alum, lump starch	3.75- 4.00
Blanc fixe, powdered	4.00- 4.25
Bleaching powder	1.50- 1.65
Brimstone (long ton, at mine)	18.00-20.00
Casein (duty paid)	15.00-16.00
Caustic soda, spot delivery	3.15- 3.25
China clay, domestic washed	12.00-15.00
China clay, foreign	15.00-22.00
Rosin, grade E	5.95- 6.00
Satin white	1.50- 1.75
Soda ash, 58 per cent light (bags)	1.50- 1.75
Starch, papermakers', in bags	2.80- ....
Talc (ton)	14.00-16.00

Meeting of American Foresters

The mid-summer meeting of the New York State Section of American Foresters was held at Cranberry Lake, August 16, 17 and 18. The members gathered at the Sophomore Camp of the New York State College of Forestry.

In addition to those who belong to the section there were several members from other states in attendance. Col. H. S. Graves, Dean of the Yale Forestry School: Samuel T. Dana, Director of the new Northeastern U. S. Forest Experiment Station recently located at Amherst, Mass.; W. H. Meyer of the same station; C. R. Tilletson, Chief of Forest Management, Washington, D. C.

Chancellor Charles W. Flint of Syracuse University accompanied the foresters on one of their field trips.

Ralph S. Hosmer, head of the School of Forestry at Cornell and President of the Society of American Foresters, reviewed work now in hand by various committees. He said that a committee had been appointed to suggest and report on a plan for supplying material from which a history of forestry in America will probably be written. He also said that a committee on professional ethics, a committtee on policies concerning the Journal of Forestry and a committee on establishing closer relations between sections of the Society, would probably report at the next meeting of the Society which will be held December 27 and 28 at Baltimore.

Col. Graves spoke informally on the world movement in forestry. He predicted his remarks on the proposition that the supply of softwoods was already a world problem. Col. Graves said that Great Britain was facing this big question squarely and that the Empire was planning for an adequate supply of timber for all time. The speaker who had just returned from a conference held by the Imperial Forestry Commission in Canada, seemed to have been tremendously impressed with the hold that forestry has taken upon civilized nations. He said that this movement was more formidable than heretofore because the public is more seriously concerned than it ever has been. He said that the conditions of timber supply in the United States was reaching a point where it will be possible to obtain constructive, remedial legislation. He said it was time to focus public sentiment on this project and that while it might not be possible to obtain all that is desired in legislation immediately, yet the prospect of a long step forward was in view. He added that this could be accomplished by the support and enactment of proposals made by the Department of Agriculture in the form of the Clark Bill. He said the scale along which we have been working was out of all proportion to the size of the problem as this question today involved one-third of the land of the country. The tremendous portion of our wealth represented in this area demands a great deal larger program than that comprehended by the Clark Bill, but Col. Graves urged that the most important thing was to get a start. He suggested that a national forestry Congress be held as soon as possible for giving exclusive consideration to the forestry problem.

Samuel T. Dana spoke on the functions of the new experiment station just located at Amherst, Mass., of which he is the head. He paid his respects to Senator Lodge and Congressman Snell who were largely instrumental in obtaining the appropriation for the station. He said the station was located at Amherst first because it was central geographically and second because it was thought wise to tie up with an agricultural institution in order to obtain the valuable cooperative work that can be had from such a related public service. He said the station, however, must be considered in the light of an independent organization cooperating with the agricultural college.

Director Dana asked for the cooperation of all similar stations because of limitations of his staff and the impossibility of their covering the entire field. The object of the investigation of the station is to place forestry on a more scientific basis. Mr. Dana suggested the organization of a research council to facilitate the solution of problems and to help guide agencies connected with this work for his district in properly functioning. The council should not be given mandatory power. It should be a body organized merely to offer advice and to correlate information obtained from the various interested agencies. The council should have representatives from the forest schools, lumber companies and all organizations represented in forestry with a changing membership.

Following Mr. Dana's suggestion a memorial was adopted by the conference favoring the creation of a council to act in an advisory capacity to forest research agencies throughout the northeastern section of the United States. The members to be selected by the chief forester of the U. S. from various groups interested in forest research. The chief forester to make selections from lists submitted by the New England and New York State Section of the Society of American Foresters.

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EXPORTS

The latest available Government statistics show that exports of paper from the United States reached a new high mark for the year in June, exportations during that month exceeding in value the March record for 1923 by more than $100,000. A total value of paper exports from the United States during June, amounting to $2,434,313, was nearly 15 per cent greater than the corresponding figure for June of last year.

Of the more important items in the paper schedule, news print, book paper, wrappings and paper board and straw board all showed decided increases both in quantity and value of exports in June as compared with May of this year. Comparisons with June, 1922, also show a healthy condition of the export trade in paper, for all except news print increased in value of shipments. Only in the case of paper board and straw board did the tonnage surpass that of June, 1922, while the other groups fell short of the comparatively high figures for that month.

The following table gives the chief paper exports from the United States during June, 1923, as compared with the preceding month and with June, 1922:

	June, 1922		May, 1923		June, 1923	
	Pounds	Dollars	Pounds	Dollars	Pounds	Dollars
Newsprint	5,804,155	262,507	2,992,242	158,056	3,304,376	167,336
Book paper	3,414,580	294,708	2,265,249	264,673	2,865,195	311,083
Wrapping, including kraft	2,873,757	192,441	1,721,358	159,186	2,725,931	225,007
Paper board and straw board	5,682,459	208,211	5,688,317	281,253	6,418,800	301,416
All other		1,164,215		1,454,822		1,429,471
Total		2,122,082		2,317,990		2,434,313

Nearly all the items in the paper schedule which are omitted from the above table showed improvement in the value of shipments abroad in June when compared with the figures of a year ago. Among those that showed rather unusual increases were writing paper, bristols and bristol board, wall board and building paper and paper hangings. Of the remanufactured articles envelopes and paper towels and napkins were outstanding in the exports in June.

IMPORTS

Wood Pulp

The statistical position of foreign wood pulp continues quite strong. Reports from primary sources invariably describe the markets abroad as firm, with producers in Scandinavia and other European countries—Germany and Finland included—being well sold up for the balance of the year, and of offerings being issued cautiously and at fully maintained prices, which in some cases are beyond a parity with market levels prevailing in the United States. Demand from paper mills for imported pulps has been fair recently. No unusual buying has been indulged in but consumers in this country have evinced considerable interest and have, in the aggregate, absorbed pulp in comparatively large amount for this time of the year.

Illustrative of the strong statistical position of wood pulp in Europe, figures just received show that England imported something like 60 per cent more pulp during the first six months of 1923 than in the same period of last year, and that practically all of this increased supply came from Scandinavian sources, thereby confirming the reports that active demand from British paper mills is one of the principal reasons pulp manufacturers in Norway and Sweden are so well sold up for this year. Importations of all kinds of pulp into England—mechanical and chemical—in the first half of 1923 totaled 480,597 tons, compared with 305,250 tons imported in the same time a year ago, nearly all of which came from Scandinavia.

Advices from Sweden say that, due to labor troubles and other deterrent factors, production of pulp in that country this year will reach a total of only about 720,000 metric tons, of which approximately 535,000 tons will be available for export, compared with a normal annual output of about 880,000 metric tons. Late estimates are that Swedish manufacturers have disposed of all their kraft pulp which they will have to export for the remainder of this year with the exception of between 35,000 and 40,000 tons, indicating that mills are well sold up, and therefore in a rather independent position.

Imports of pulp into the United States keep up on a fairly high level. In June last imports totaled 89,962 net tons of chemical pulp and 16,791 net tons of ground wood, contrasted with imports of 65,137 tons of chemical and 15,793 tons of mechanical in the preceding month, and bringing the total for the first six months of this year up to 522,349 net tons of chemical, or an average of 87,058 tons monthly, against a monthly average of 67,697 tons in the same time last year, and a total of 135,146 tons of ground wood for a monthly average of 22,524 tons, compared with a monthly average of 13,642 tons in the same time of 1922.

Quotations on foreign pulps are characterized by fair firmness. There has been some selling in certain quarters, however, at concessions, but such cases have been the exception rather than the rule and have been occasioned by importers being anxious to convert some lots of stock into cash. Prices are on a rather broad range. No. 1 unbleached sulphite has sold at as low as 3.15 cents per pound ex dock New York, while importers generally quote this description of pulp at around 3.35 cents, with extra strong sulphite held for 3.40 cents and even 3.50 cents on the dock. Bleached sulphite is quoted at around 4.50 cents for No. 1 grade ex dock at Atlantic seaports, while easy bleaching sulphite is quoted at 3.50 to 3.75 cents per pound on the dock. Kraft ranges in price from 3 to 3.40 cents a pound; Swedish No. 1 kraft is held at 3.25 to 3.40 cents in most cases, whereas some foreign kraft has been sold down to 3 cents ex dock New York, one 5,000-ton lot being sold to a Middle West board mill at this price. Imported ground wood is quoted at about $50 per ton ex dock New York and is beyond a parity with the domestic product.

Receipts at the port of New York in August and current market quotations ex dock New York follow:

Bleached sulphite, No. 1	$ 4.25- 4.75
Unbleached sulphite, No. 1	3.15- 3.40
Easy bleaching	3.40- 3.65
Mitscherlich unbleached	3.50- 3.75
Kraft	3.00- 3.40
Ground wood, per ton	50.00-52.00

Castle & Overton, 1,075 bls. from Bremen and 532 bls. from Rotterdam; H. Hollesen, 4,892 bls. from Bremen; Johaneson, Wales & Sparre, 1,200 bls. from Gothenburg, 5,400 bls. from Harnosand, 1,500 bls. from Swedish Ports and 2,919 bls. from Stockholm; Nilsen, Lyon & Co., 300 bls. from Christiania; M. Gottesman & Co., 333 bls. from Hamburg and 2,400 bls. from Rotterdam; Lagerloef Trading Co., 2,200 bls. from Helsingfors; Scandinavian Pulp Agency, 1,200 bls. from Harnosand; Pagel, Horton & Co., 2,080 bls. from Gefle and 22,100 bls. from Stockholm; E. M. Sergeant & Co., 508 bls. from Gothenburg and 250 bls. from Greaker; Bulkley, Dunton & Co., 3,750 bls. from Swedish Ports, 1,250 bls. from Iggesund, 1,000 bls. from Gefle and 750 bls. from Sundsvall; Whalen Pulp and Paper Mills, 4,930 bls. from Port Alice, B. C.; International Acceptance Bank, 3,500 bls. from Gothenburg and 1,000 bls. from Greaker; National City Bank, 3,078 bls. from Rotterdam and 3,300 bls. from Sundsvall; F. R. Eaton, 7,788 bls. ground wood from Bridgewater, N. S.; J. Andersen & Co., 1,800 bls. from Greaker; E. J. Keller Co., 100 bls. from Hamburg; Bank of America, 1,500 bls. from Sundsvall; Tidewater Paper Mills Co., 38,365 bls. ground wood from Liverpool, N. S., 8,293 bls. ground wood from Bathurst, N. B., and 927 tons ground wood from Chatham, N. B.; Order, 117 bls. from Hamburg.

Paper Stock

Probably the feature in paper stock imports during August was the increase in arrivals of rags. Fairly voluminous and numerous shipments of rag stock were received from various European sources, the total importations showing an

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appreciable gain over the several previous months. Imports of old rope, bagging and miscellaneous papermaking materials were comparatively light though a few moderately large shipments were received. Paper stock imports are likely to increase very materially during September since quite a number of dealers from New York have been in Europe recently and it is understood that they purchased in heavy volume while on the other side of the Atlantic. Arrivals at the port of New York in August follow:

Old Rope

Brown Bros. & Co., 29 bls. from Rotterdam, 142 bls. and 52 coils from Antwerp, 141 coils from Bristol and 197 coils from Hull; Fulton Smelting & Refining Co., 49 bls. from Ponce; Ellerman-Wilson S. S. Line, 84 bls. from London, 6 coils from Liverpool and 11 coils from Hamburg; Chemical National Bank, 68 bls. and 32 coils from Rotterdam; Waste Material Trading Corp., 92 bls. from Hamburg; George W. Millar & Co., 12 coils and 25 bls. from Hamburg; Guaranty Trust Co., 31 bls. from Leghorn; W. Van Doorn, 2 bls. from Rotterdam; International Acceptance Bank, 284 coils and 35 bls. from Christiania; Order, 78 coils from Antwerp and 80 coils from Rotterdam.

Old Bagging

E. J. Keller Co., 156 bls. from Rotterdam and 143 bls. from Antwerp; Mechanics & Metals National Bank, 133 bls. from Havre; Waste Material Trading Corp., 134 bls. from Rotterdam; E. Butterworth & Co., 63 bls. from Rotterdam; Schulz & Ruckgaber, 58 bls. from Liverpool; L. H. Abenheimer, 82 bls. from Rotterdam; Katzenstein & Keene, 126 bls. from Rotterdam; Italia America S. S. Line, 23 bls. from Genoa; Strupp & Co., 110 bls. from Manchester; Order, 86 bls. from Genoa and 94 bls. from Antwerp.

Rags

Castle & Overton, 95 bls. from Rotterdam, 966 bls. from Hamburg, 66 bls. from Liverpool, 342 bls. from St. Nazaire and 31 bls. from Trieste; Katzenstein & Keene, 161 bls. from Rotterdam; E. J. Keller Co., 34 bls. from Rotterdam, 936 bls. from Hamburg and 91 bls. from Antwerp; R. Wolf, 222 bls. from Rotterdam; S. Silberman Co., 33 bls. from Rotterdam; Maurice O'Meara Co., 39 bls. from Hamburg; Darmstadt, Scott & Courtney, 40 bls. from Hamburg; L. H. Abenheimer, 561 bls. from Hamburg; Stone Bros. & Victor Galaup Co., 375 bls. from Leghorn, 1,042 bls. from Havre and 52 bls. from Bordeaux; Consolidated Rag Co., 20 bls. from London; Waste Material Trading Corp., 210 bls. from Rotterdam; W. Schall & Co., 37 bls. from Rotterdam and 325 bls. from Hamburg; Goldman, Sachs & Co., 75 bls. from Hamburg, 209 bls. from St. Nazaire, 28 bls. from Rotterdam and 727 bls. from Christiania; American Express Co., 41 bls. from Glasgow; Paul Berlowitz, 81 bls. from Rotterdam; American Woodpulp Corp., 522 bls. from Rotterdam; Kelly & Co., 403 bls. from Antwerp; Mechanics & Metals National Bank, 122 bls. from Havre, 49 bls. from Antwerp and 48 bls. from Manchester; International Acceptance Bank, 28 bls. from Havre, 462 bls. from Bremen, 73 bls. from Glasgow, 342 bls. from Newcastle, 57 bls. from Dublin, 184 bls. from London, 34 bls. from Antwerp, 341 bls. from Manchester, 189 bls. from Swansea and 752 bls. from Christiania; Guaranty Trust Co., 87 bls. from Hamburg, 373 bls. from Belfast, 294 bls. from Manchester, 174 bls. from Swansea and 133 bls. from Glasgow; New York Trust Co., 410 bls. from Bordeaux; Garfield National Bank, 119 bls. from Hamburg; Bank of New York & Trust Co., 86 bls. from Antwerp; Columbia Bank, 291 bls. from Dunkirk; Bankers Trust Co., 412 bls. from Dunkirk; Brown Bros. & Co., 279 bls. from Antwerp, 111 bls. from Glasgow and 105 bls. from Newcastle; R. Ingram, 21 bls. from Havre; G. P. Lotterhand, 4 bls. from Rotterdam; C. G. Keferstein, 180 bls. from Rotterdam; Kidder, Peabody & Co., 404 bls. from Dunkirk and 175 bls. from Antwerp; Ladenburg, Thalman & Co., 45 bls. from Bremen; Pickford's Colenial Line, 89 bls. from London; E. W. Dutton, 14 bls. from Manchester; Albion Trading Co., 8 bls. from Liverpool; Brown, Shipley & Co., 63 bls. from Glasgow; Coal & Iron National Bank, 180 bls. from Bremen; Order, 74 bls. from Liverpool, 383 bls. from Hamburg, 40 bls. from Rotterdam, 6 bls. from Rio de Janeiro, 13 bls. from Manchester and 10 bls. from Colombo.

Miscellaneous Paper Stock

Daniel M. Hicks, Inc., 29 bls. from Dunkirk; E. J. Keller Co., 574 bls. from Antwerp, 174 bls. from Trieste and 61 bls. from Hamburg; Salomon Bros. & Co., 100 bls. from Hamburg; Guaranty Trust Co., 30 bls. from Glasgow; Irving Bank-Columbia Trust Co., 419 bls. from Antwerp; Brown Bros. & Co., 91 bls. from Dundee and 88 bls. from Dublin; Equitable

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Philadelphia, Pa.....318 Widener Bldg.
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"Steel for Strength—Wood for Durability"

Trust Co., 58 bls. from Dunkirk; Order, 500 bls. from Antwerp and 71 bls. from Glasgow.

Paper

Kraft wrapping paper continued to arrive from Scandinavian and German sources in large amounts in August and was easily the feature of paper imports into the United States last month. Receipts of news print also were comparatively heavy, judging from the arrivals through the port of New York. Usual shipments of filter, cigarette, hanging and other kinds of paper were received. Receipts of paper of all kinds through the port of New York in August follow:

Cigarette

Rose & Frank Co., 230 cs. from Havre and 64 cs. from Southampton; R. J. Reynolds Tobacco Co., 1,010 cs. from St. Nazaire; DeManduit Paper Corp., 390 cs. from St. Nazaire and 23 cs. from Havre; American Tobacco Co., 1,700 cs. from Bordeaux; P. J. Schweitzer, 209 cs. from Antwerp, 33 cs. from Marseilles and 2 cs. from Havre; British-American Tobacco Co., 21 cs. from Liverpool and 60 cs. from Havre; H. H. Strauss, 50 cs. from Havre; Joakim Co., 10 cs. from Hamburg; Miguel, Coata & Miguel, 7 cs. from Marseilles; Royal Turkish Tobacco Co., 2 cs. from Genoa; E. Waters, 20 cs. from Marseilles; Order, 16 cs. from Constanza and 20 cs. from Marseilles.

Printing

F. B. Vandegrift & Co., 211 cs. from Hamburg; Falsing Paper Co., 217 cs. from Hamburg; Chemical National Bank, 11 bls. from Glasgow and 377 rolls from Hamburg; Perry, Ryer & Co., 117 cs. from Glasgow; Perkins-Goodwin Co., 55 cs. from Glasgow; Irving Bank-Columbia Trust Co., 111 rolls from Christiania and 497 rolls from Copenhagen; American Exchange National Bank, 135 rolls from Christiania; Parsons & Whittemore, 501 rolls from Bremen; H. Reeve Angel & Co., 28 bls. from Bremen; United States Lines, 1,179 rolls from Bremen; B. F. Drakenfeld & Co., 41 cs. from Liverpool; Wilkinson Bros. & Co., 18 bls. from Antwerp; J. P. Heffernan Paper Co., 29 bls. from Rotterdam; Paper House of Pennsylvania, 42 rolls from Copenhagen and 35 rolls from Bremen; Funch, Edye & Co., 59 rolls from Copenhagen; P. C. Zuhlke, 33 cs. from Rotterdam and 60 cs. from Hamburg; Corn Exchange National Bank, 120 rolls from Hamburg; Newsprint Paper Corp., 194 rolls from Gothenburg; J. L. N. Smythe Co., 57 cs. from Hamburg; C. K. MacAlpine & Co., 13 cs. from Rotterdam; Order, 2,688 rolls from Bremen, 147 rolls from Copenhagen, 88 rolls from Christiania, 18 rolls from London, 197 rolls from Trieste, 11 cs. from Genoa, 365 rolls from Hamburg and 12 rolls from Hull.

Wrapping

Ladenburg, Thalman & Co., 636 bls. and 890 rolls from Hamburg; Republic Bag & Paper Co., 1,593 rolls from Rotterdam and 46 rolls from Hamburg; J. B. Moors & Co., 2,212 bls. and 62 rolls from Hamburg and 1,175 bls. from Trieste; C. Steiner, 12 bls. from Bremen and 18 bls. from Hamburg; Melby, Kuttroff & Co., 22 bls. from Gothenburg, 10 rolls and 21 bls. from Hamburg and 390 rolls from Bremen; Blauvelt-Wiley Paper Mfg. Co., 175 bls. from Glasgow; R. Cushman & Co., 2 bls. from Genoa; C. G. Keferstein, 79 bls. from Bremen; Bernard, Judae & Co., 134 bls. from Hamburg; Wilkinson Bros. & Co., 1,199 rolls from Rotterdam, 675 rolls and 628 bls. from Hamburg and 22 bls. from Antwerp; Gallagher & Ascher, 126 bls. from Hamburg; Maurice O'Meara Co., 340 bls. from Hamburg, 17 bls. from Bremen and 185 bls. from Christiania; W. Hartman & Co., 935 rolls and 722 bls. from Hamburg; F. K. Trading Corp., 105 rolls from Hamburg; Fourth National Bank, 54 rolls from Hamburg; Corn Exchange National Bank, 53 bls. from Hamburg and 461 rolls and 54 bls. from Gothenburg; Irving Bank-Columbia Trust Co., 54 rolls and 5 bls. from Hamburg and 1,707 rolls from Gothenburg; Chemical National Bank, 1,095 rolls and 101 bls. from Hamburg; Chase National Bank, 156 rolls and 12 bls. from Hamburg; Chatham & Phenix National Bank, 331 rolls from Gothenburg; International Acceptance Bank, 2,721 bls. and 258 rolls from Hamburg and 39 bls. from Gothenburg; National City Bank, 153 bls. and 126 rolls from Gothenburg and 981 bls. and 127 rolls from Hamburg; New York Trust Co., 3,053 rolls and 1,526 bls. from Trieste; Guaranty Trust Co., 1,923 rolls from Hamburg; Peoples Trust Co., 3,271 rolls and 3 bls. from Gothenburg; Globe Shipping Co., 74 bls. from Trieste; American Express Co., 3,065 rolls from Gothenburg; J. P. Heffernan Paper Co., 11 bls. from Rotterdam; Birn & Wachenheim, 13 bls. from Hamburg; Furness, Withy & Co., 131 rolls from Gothenburg; D. S. Walton & Co., 35 bls. from

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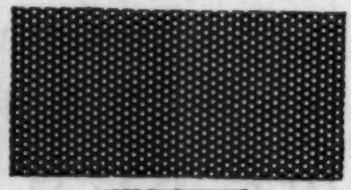

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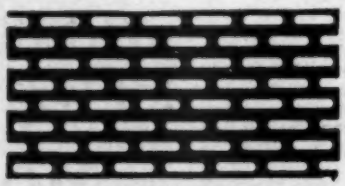

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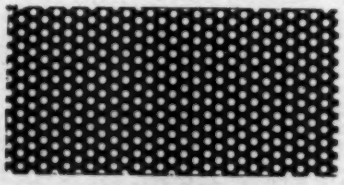

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Hamburg; Import Paper Co., 5 bls. from Hamburg; Order, 975 rolls and 1,550 bls. from Gothenburg, 51 rolls and 101 bls. from Hamburg, 60 bls. and 10 rolls from Rotterdam and 217 rolls and 392 bls. from Bremen.

Writing

J. W. Hampton, Jr., & Co., 7 cs. from Hamburg; Funch, Edye & Co., 26 rolls from Copenhagen; White-Burbank Paper Co., 3 cs. from Glasgow; C. Steiner, 11 cs. from Bremen; Independent Forwarding Co., 3 cs. from Havre; Order, 34 cs. from Liverpool.

Drawing

E. Dietzgen & Co., 34 cs. from Hamburg, 1 cs. from Southampton and 10 cs. from Rotterdam; Keuffel & Esser Co., 36 cs. and 34 rolls from Hamburg; Devoe & Raynolds Co., 2 cs. from Southampton; Order, 2 cs. from Southampton.

Filter

J. Manheimer, 235 bls. from Southampton and 48 bls. from Havre; H. Reeve Angel & Co., 3 cs. from Hamburg and 13 cs. from Southampton; E. Fougera & Co., 85 cs. from Southampton; Orbis Products Trading Co., 10 bls. from Bordeaux; Zinkeisen & Co., 10 cs. from Hamburg.

Tissue

Meadows, Wye & Co., 7 cs. from Liverpool; J. C. Robold & Co., 13 bls. from Liverpool; Meagher-Devoy Shipping Co., 11 cs. from Liverpool; F. C. Strype, 26 cs. from Liverpool; Wilkinson Bros. & Co., 16 cs. from Genoa.

Photo

National City Bank, 15 cs. from Antwerp; Gevaert Co. of America, 81 cs. from Antwerp; Globe Shipping Co., 253 cs. from Bremen; J. J. Gavin & Co., 4 cs. from Liverpool; P. C. Zuhlke, 45 cs. from Rotterdam; F. Henjes, Jr., 89 bls. from Bremen; M. G. Lange & Co., 12 cs. from Rotterdam.

Hanging

A. Murphy & Co., 5 bls. from Liverpool, 9 bls. from Hamburg, 2 bls. from Havre and 4 cs. from Southampton; W. H. S. Lloyd & Co., 17 bls. from London, 22 bls. from Southampton and 2 bls. from Liverpool; Erstein & Co., 10 cs. from Havre; F. G. Prager & Co., 1,163 rolls from Hamburg and 1 cs. from Copenhagen; National City Bank, 1,689 bls. from Bremen and 1,130 rolls from Hamburg; R. F. Downing & Co., 6 bls. from Southampton; A. C. Dodman, Jr., & Co., 5 cs. from Southampton, 8 bls. from Liverpool and 5 bls. from Antwerp; Cowtan & Sons, 2 cs. from Southampton; Order, 14 cs. from Antwerp, 400 cs. from Bremen and 486 rolls from Hamburg.

Board

Harriet Hubbard Ayer, 7 cs. from Havre; Bendix Paper Co., 196 cs. from Hamburg; Metropolitan Import & Mfg. Co., 251 cs. from Hamburg; M. Kraus & Co., 2 cs. from Hamburg; Irving Bank-Columbia Trust Co., 245 rolls from Hamburg; F. G. Prager & Co., 45 cs. from Hamburg; Draeger Shipping Corp., 2 cs. from Hamburg; Alpers & Mott, 33 cs. from Bremen; Happel & McAvoy, 6 cs. from Southampton; Houbigant, Inc., 7 cs. from Havre and 7 cs. from Southampton; Buschmann Bros., 189 rolls from Hamburg; Friedmann & Co., 7 cs. from Bremen; Order, 45 bls. from Gothenburg and 32 rolls from Hamburg.

Miscellaneous

Coenca-Morrison Co., 6 cs. from Havre; Whiting-Patterson Paper Co., 14 cs. from Havre; A. Frankan & Co., 19 cs. from Bremen; Japan Paper Co., 16 cs. from Gothenburg, 19 cs. from Havre and 53 cs. from Genoa; H. Reeve Angel & Co., 5 cs. from Gothenburg; J. Munroe & Co., 8 cs. from Hamburg; Gallagher & Ascher, 8 cs. from Havre; American Trading Co., 2 cs. from Gothenburg; Birn & Wachenheim, 10 cs. from Southampton and 23 cs. from Havre; P. H. Petry & Co., 53 cs. from Hamburg and 6 bls. from Havre; F. B. Vandegrift & Co., 44 cs. from Hamburg; Judson Freight Forwarding Co., 13 cs. from Havre and 6 cs. from Copenhagen; Hudson Forwarding & Shipping Co., 4 cs. from Hamburg; Columbia Overseas Corp., 12 cs. from Rotterdam; C. B. Richard & Co., 32 cs. from Havre and 24 cs. from Hamburg; Globe Shipping Co., 14 cs. from Bremen; F. Henjes, Jr., 50 cs. from Hamburg; Louis DeJonge Co., 47 cs. from Antwerp; Gubont, Freres & Co., 12 cs. from Havre; Favor, Ruhl & Co., 3 cs. from Havre; C. H. Morehouse, 7 cs. from Havre; Coe Generale Trans, 16 cs. from Havre; Lemcke & Buechner, 2 cs. from Havre; Wilkinson Bros. & Co., 15 cs. from Havre; Irving Bank-Columbia Trust Co., 8 cs. from Antwerp; National City Bank, 10 cs. from

New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

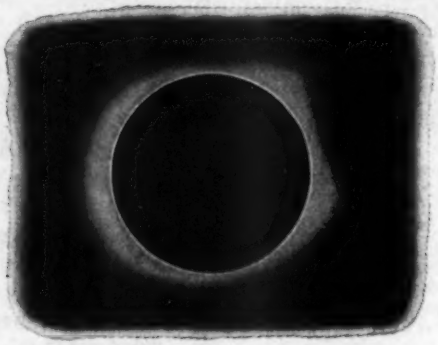
Send for full particulars

Hungerford & Terry, Inc.
CLAYTON, N. J.

NORWOOD FILTERS

Clean Water
Low Maintenance Cost
Reliable

NORWOOD ENGINEERING CO.
FLORENCE, MASS., U. S. A.



A total eclipse!

WHEN compared with the increased profits which result from using a quality Fourdrinier wire, the cost of the wire is many times eclipsed or overshadowed.

Shutdowns for wire replacements are costly —the interest on the Fourdrinier investment, the depreciation, the labor and over-head added to lost production, make a total which greatly affects profits.

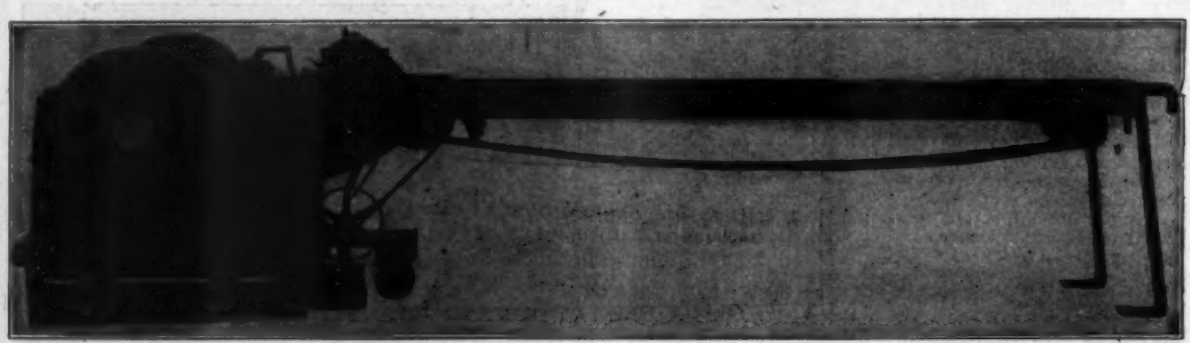
The difference of a few cents a foot in the cost of a Fourdrinier wire may mean the saving of many dollars in fewer shutdowns for wire replacements. This is the reason many paper mill superintendents specify Tyler Fourdrinier Wires.

Tyler Fourdrinier Wires are made in all widths up to and including 250 inches.

The W. S. TYLER COMPANY, Cleveland, Ohio

Manufacturers of Woven Wire Screen and Screening Equipment

No. 11 "GIANT" PAPER STOCK CUTTER



Capacity 2½ Tons Per Hour

Especially Adapted for Handling Waste Paper, Magazines, Etc., Before Feeding to the Beaters

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LET US FIGURE IT OUT FOR YOU

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133 Finsbury Pavement, London E. C.
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Antwerp; Royal Lace Paper Works, 4 cs. from Hamburg; Bernard, Judae & Co., 2 cs. from Gothenburg; Quality Art Novelty Co., 164 cs. from Hamburg; T. Nevin, 3 cs. from Southampton; D. B. Tyson, 5 cs. from Havre; C. A. Johnson & Co., 89 bls. from Liverpool; Borden & Riley Paper Co., 15 cs. from Antwerp; Import Paper Co., 12 cs. from Rotterdam; Fuchs & Lang Mfg. Co., 60 cs. from Canton; F. L. Kraemer & Co., 13 bls. from London; Martin & Bechtold, 18 cs. from Bremen; C. H. Boulin, 19 cs. from Havre; Draeger Shipping Corp., 4 cs. from Havre.

Foreign Trade Opportunities

No. 7302—News print, writing and cigarette paper. Teheran, Persia. Agency desired.

No. 7336—Paper and stationery. Damascus, Syria. Agency desired.

No. 7329—Wrapping and writing paper. Alexandria, Egypt. Purchase and agency desired.

No. 7394—Paper. Athens, Greece. Agency desired.

No. 7404—Paper, print, machine finished book, imitation parchment, cream laid, loose leaf ledger, etc. Johannesburg, South Africa. Purchase desired.

No. 7453—Paper and cardboard. Latin America. Agency desired.

No. 7423—Parchment paper in ton lots, and pure vegetable parchment. Quebec, Canada. Purchase desired.

No. 7472—Vegetable parchment. Johannesburg, South Africa. Agency desired.

No. 7431—Stationery. Johannesburg, South Africa. Exclusive agency desired.

No. 7475—Caustic soda. Rio de Janeiro, Brazil. Agency desired.

Large Paper Production in Orient

The manufacture of paper has increased tremendously in China and Japan, particularly the latter country, within the last few years.

Prior to 1913, Japan was a large buyer of foreign paper, the bulk of which came from England and the United States. The war, however, gave a remarkable impetus to the paper manufacturing industry in Japan, the effect of which is still felt, and Japan is now shipping abroad papers made in the foreign style. Japaneses factories engaged in the manufacture of machine-made paper concentrate on the production of printing paper, one-half of their total output consisting of newsprint, and a quarter of other printing papers. Not only are they producing sufficient newsprint for the Japanese press, but there is a surplus which permits of exportation.

Figures published in "Finance and Commerce" (Shanghai) gives the total value of paper manufactures exported from Japan in 1920 as over 34 million yen, compared with nearly 37 million yen in 1919. China is the largest importer of Japanese paper, and with Manchuria takes about half of Japan's shipments of this commodity. Hong Kong and India are at present the next largest buyers, Siberia also being a large importer. In China there are eight provinces which are noted for paper production, viz., Kiangsi, Fukien, Szechwan, Chekiang, Anhwei, Hunan, Hupeh, and Kwangtung. Chekiang produces the most and Anhwei the best. The raw materials used are rice straw, mulberry, bamboo, tsu-tree, tan-tree, hemp, cotton, rags, and waste paper.

Chinese-made paper, like most other commodities, is unable to compete with imported goods in quality and price, and in order to protect home industries efforts have been made to establish modern factories. Very little success, however, has been achieved, and several paper plants established have discontinued operations.

Chinese export paper trade is confined almost entirely to the countries of Far Eastern Asia and India, Hong Kong, which re-ships most of the paper, being the largest importer.

The Fourth Annual Norwegian Industries Fair will be held in Christiania, September 2 to 9. This fair, which will feature several classifications of Norwegian paper products, is aimed primarily at buyers, who welcome it in addition to its commercial uses as an opportunity to visit the famous Norwegian fjords. It will be formally opened by King Haakon.

According to reports from Australia, an excellent paper has been manufactured from pulp consisting of 65 per cent of black-butt, 25 per cent imported pulp and 10 per cent waste paper. Exceptionally strong light-weight paper which is suitable for writing, envelope, typing, book, magazine, and similar higher grade printings can be made from black-butt, according to report on experiments made at the Forest Products Laboratory in Perth, W. A.

STANDARD BLEACHING POWDER

Manufactured by

Pennsylvania Salt M'f'g Co.
PHILADELPHIA, PA.

Quality Guaranteed

The Smallwood-Low Stone Co.
Lisbon, Ohio
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The Turbo Air Washer with Tandem Atomizer

Double atomizing discs mounted in tandem on a motor-driven shaft, create a double spray of atomized water. Spray will not clog.

A New Departure in Air-Washer Construction

Air passes through an uninterrupted double water spray that cannot clog. Dust, soot and other impurities are removed before air enters the distribution ducts. As a complete conditioning unit it cleanses, tempers and conditions the air, keeping temperature and humidity uniform throughout the year, regardless of outside weather conditions.

No modern church, school, theatre, hotel, restaurant, food producing establishment, public and office building is complete without a Bayley Air-Washer and Conditioner.

Write for booklet

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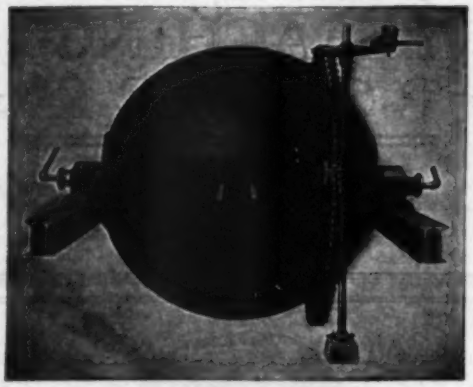

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Digesters
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"No Stronger Than Its Weakest Link"

IT is as true in the manufacture of Rotary Bleaching Boilers as in the making of chain that the whole is no stronger than its weakest link.

Thus it is that Biggs Rotary Boilers, in the various operations incident to their manufacture, pass through rigid inspections that there may develop no "weak links."

Modern, heavy-duty hydraulic forming presses, huge hydraulic riveters, up-to-date caulking methods, complete facilities for both electric and oxyacetylene welding. All these things, coupled with the efficient, trained mechanics who operate them, assure the correctness of Biggs operations at every point of construction.

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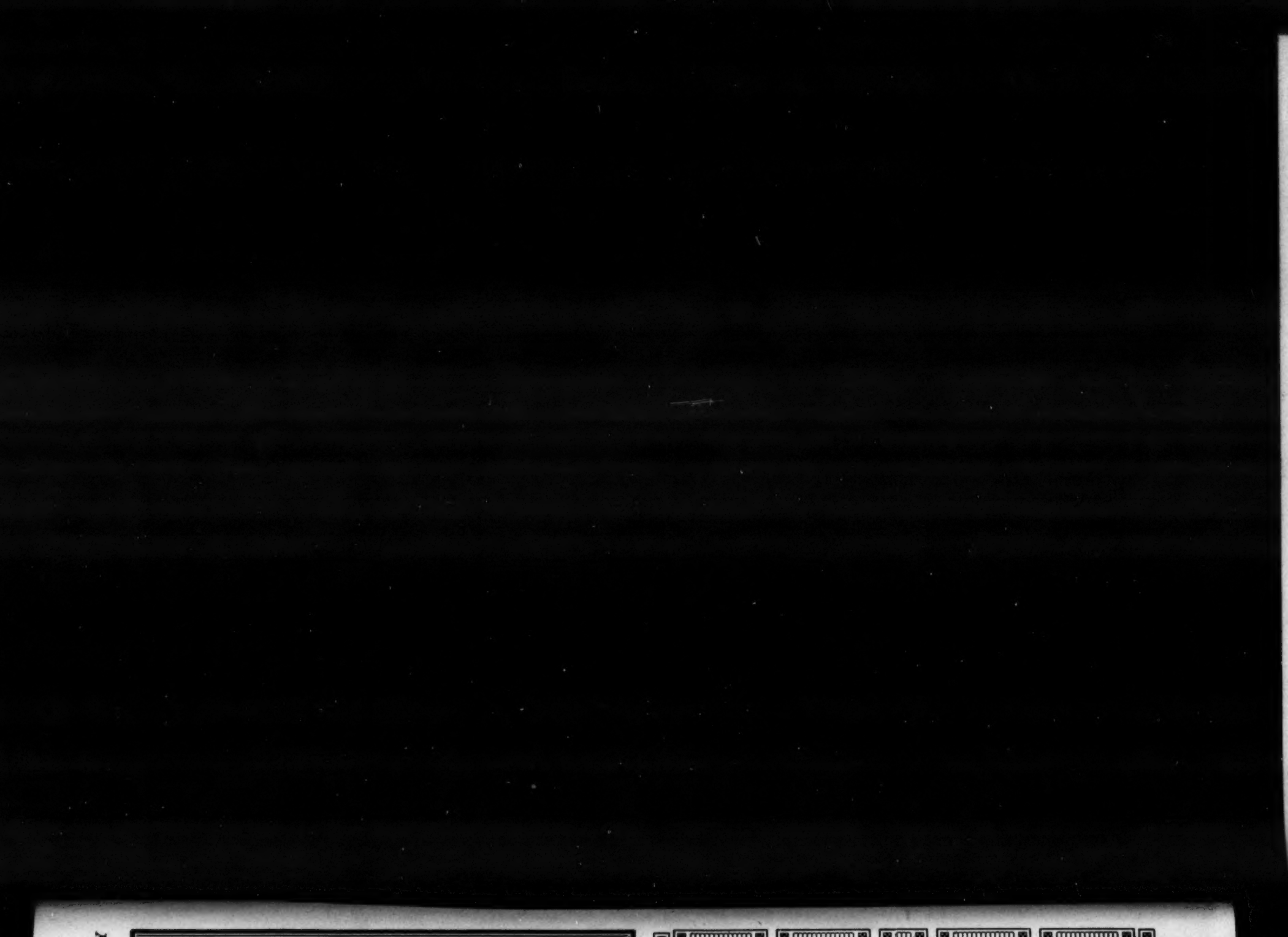
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